The Business Journal of Vegetation Management May 1979/$1.25

WEEDS TREES & TURF

Integrated Control for Tree Pests

Postemergent Herbicides for Nutsedge

Selection and Care of Groundcovers

Adult Bronze Birch Borer and D-Shaped Emergence Hole

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Because of the design and construction of our full line of sprinkler heads and our extensive testing and quality control program, J-M Buckner heads will put out the amounts of water to the degree and configuration specified in our published technical data. Practically speaking, it means you can design our sprinkler into your system and be confident of a high level of performance in dispersing water when and where you need it.

The One Company That Has It All.

Working in conjunction with our nationwide network of trained distributors, J-M Buckner has a broad range of products and services to meet virtually any irrigation need. We offer you everything you need, whether it's for residential applications or a 36-hole golf course. Dealing with just one source is easier and economically more efficient for you. And you can be assured of compatible components that are backed by Johns-Manville.

To learn more about Waterscaping (technical information, planning assistance or quality irrigation system components), contact your J-M Buckner Distributor or Vince Nolletti, P.O. Box 232, Fresno, CA 93708, (209) 442-8511.

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On the greens, the fairways...all around the links, inside the clubhouse and under all the sinks

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WT&T

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GREEN INDUSTRY NEWS

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THAT WILL OUTPERFORM
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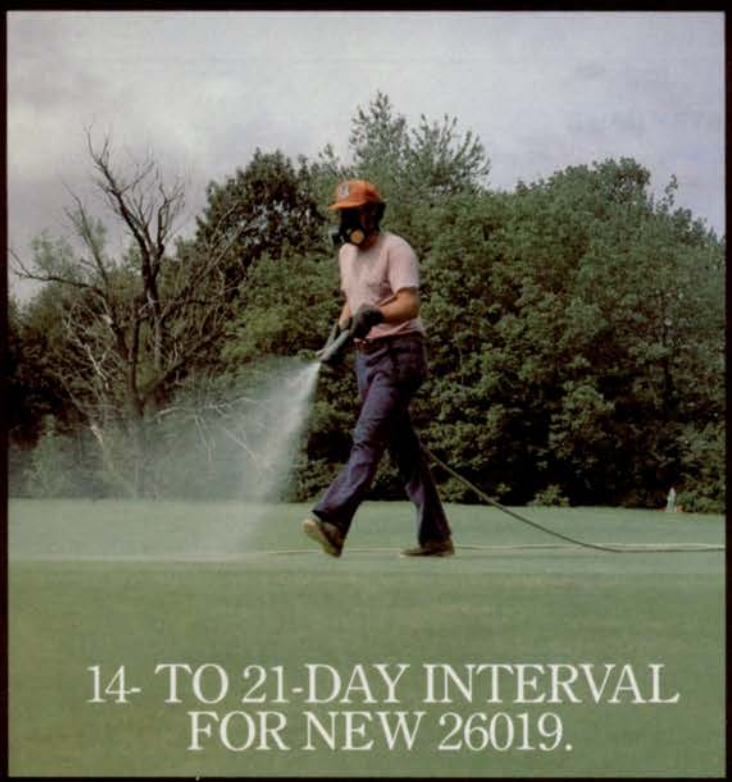

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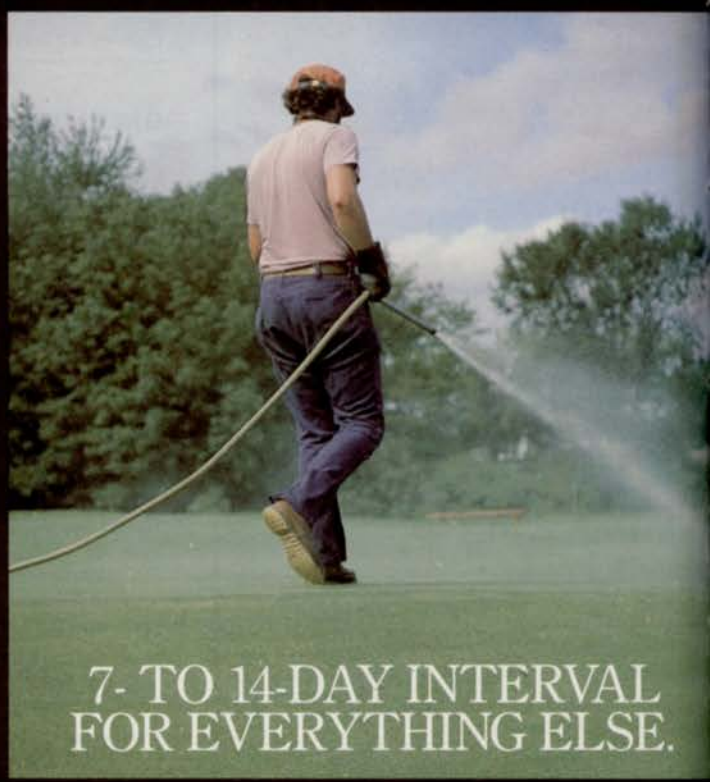
FOR NEW 26019.



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FOR EVERYTHING ELSE.

Here's a new fungicide that could change your whole way of thinking about broad-spectrum fungus control *and* spray intervals. Because new Chipco 26019 gives more control with fewer sprays than any of the old fungicides you've had to use.

It stops the major turf diseases—dollar spot (including benomyl-resistant dollar spot), brown patch and Helminthosporium (leaf spot). And it does it for up to three weeks, at low, economical rates.

It's a nice material to handle, too. It mixes well, with no residual left in the tank. It also presents no problems of phytotoxicity to turf.

Last year was a wet one, with unusually high disease pressure in most areas. Yet, Chipco 26019 performed beautifully in wide-spread tests. This year, you'll have the chance to see how well it can perform for you. So ask your chemicals distributor for this welcome addition to the popular Chipco

6019. A TURF FUNGICIDE NYTHING ELSE YOU CAN USE, E NUMBER OF SPRAYS.

ine of turf fungicides and herbicides. It will outperform anything else you an use, with about half the number of sprays.

"YOU FOLKS HAVE SOMETHING GOOD HERE."

"The main reason I'll use Chipco 26019 is to control dollar spot. Pick-ng up brown patch and the others is gravy, as far as I'm concerned. This is real good new chemical."

—Bob Dickison, golf course superintendent
Upper Montclair Country Club, Clifton, N.J.

"I feel very good about this product. We tested it during one of the oughest summers in my memory. I think, over a 14-day period in August, we had very close to 10 inches of rain. It was an acid test for the material. These chemicals come and go, and some of them are short-lived. But you olks have something good here. The sprayability of Chipco 26019 is very mpressive. And you only need six to 10 hours of drying time, which helps a ot during rainy periods. Some other materials require at least 12 hours."

—Paul Boizelle, golf course superintendent,
and John Fenwick, foreman,
Fiddler's Elbow Country Club, Far Hills, N.J.

"We started using Chipco 26019 in June of 1977. Before we started sing it, we had very little luck with our other contact and systemic fun-gicides in certain areas. We were applying some con-act fungicides at preventative and curative rates, and till only getting two or three days control, with the sual cold fronts coming through, followed by large utbreaks of dollar spot. Since we started using hipco 26019, we haven't found dollar spots in these reas at all."

—Randy Wahler, golf course superintendent
Glen Flora Golf Course, Waukegan, Ill.

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VIEWPOINT

Bruce F. Shank, Editor

Weeds Trees & Turf, once a champion of the rights and interests of the smaller segments of the Green Industry, is having an identity crisis.

Success has harmed the once comfortable feeling arborists and sod producers had about the magazine. They say we don't cover them as intimately as we used to, because we are too "establishment" now with increased coverage of landscape and nursery markets. Since they feel neglected and overlooked, the cooperation between the magazine and leaders in their associations is failing. The situation, as it now stands, is, "call our association if you want to know something, but don't expect us to help the magazine."

Sure, the magazine is a business enterprise and it makes a profit. And yes, we are spoiled by the attention received from the Associated Landscape Contractors of America, the American Nurserymen and affiliated groups, strong regional turf groups, and The Golf Course Superintendents' Association.

But, if the smaller associations would look closely at the magazine, the question and answer columns, the reader reply card for the editor, and the interview articles we have carried in the past year, they would see that the magazine is designed to be responsive, and is being responsive to those that ask it to be responsive.

This is not a cop out! We do strive to attend the annual meetings of ALL associations when we can. No one is goofing off here. We have worked hard to improve *Weeds Trees & Turf* and we have succeeded.

So let me apologize for our lack of attention to your problems. Let me restore that once intimate relationship *Weeds Trees & Turf* had with your industries. But, please, help us out a little bit.

One simple way is for the association to establish a public relations committee. I'll be more than willing to meet with the committee, pinpoint needed coverage, and provide that coverage in a quality and thoroughness not possible by smaller or less professional publications.

One final note. I fully support and will be glad to offer some of our resources to help association publications. *Turf News* by the American Sod Producers and *The Journal of Arboriculture* by the International Society of Arboriculture are absolutely superb publications! I concede that WTT could never match the attention an association publication can give your profession. There just isn't room in one publication to provide that kind of attention for every profession. I wish we could, but we can't print huge volumes and lose money for our stockholders.

AN OPEN MESSAGE TO LAWN AND GARDEN MANUFACTURERS

From C. Edward Scofield, Executive Vice President, RA-PID-GRO Corporation

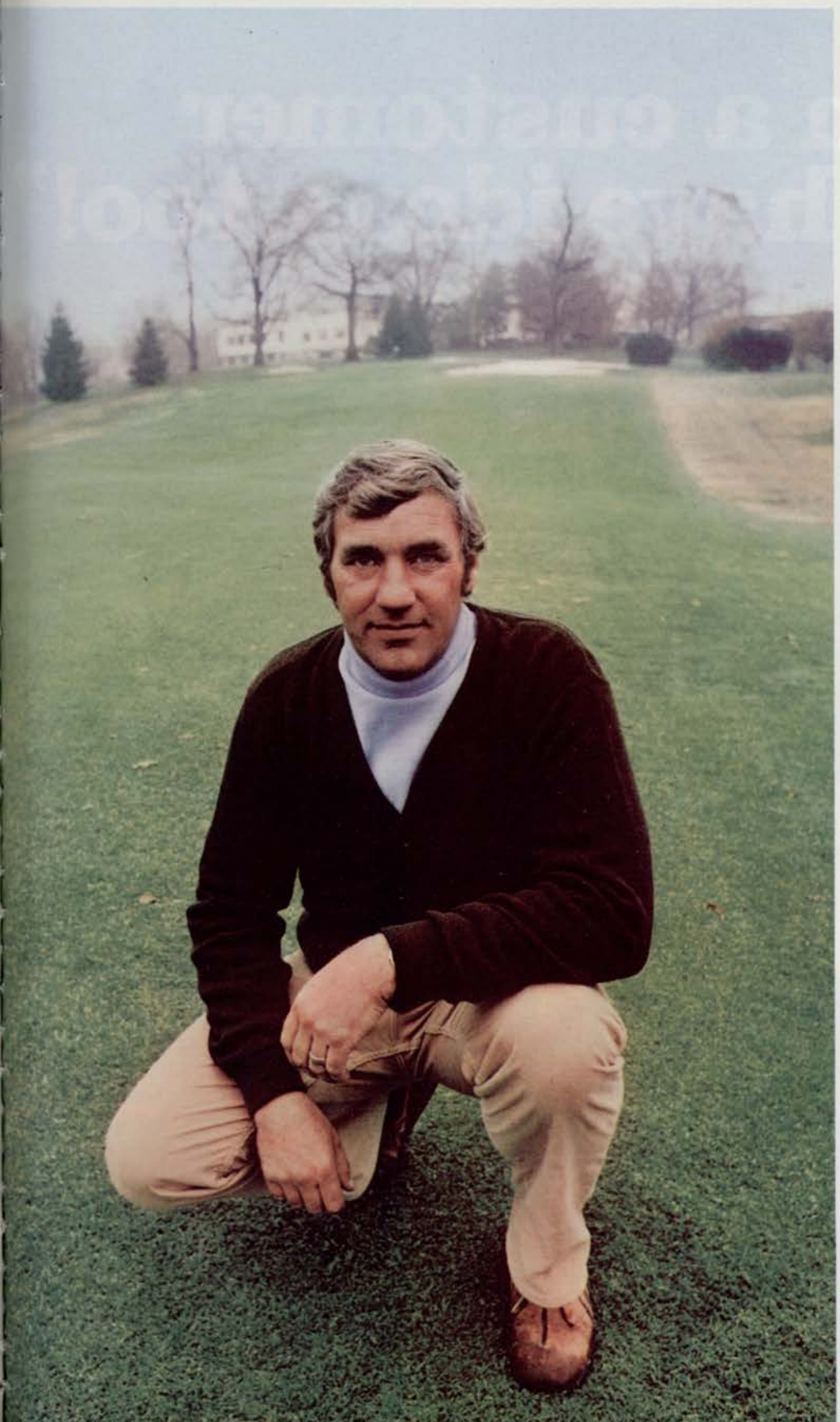
"I've helped the lawn and garden industry to grow to an $11 billion giant! It has been my privilege to frequently be a part of some of the great new changes and developments. I've also experienced my share of disappointments and mistakes. Without strong trade organizations, dedicated pioneers and competent leaders our industry would only be a fraction of what it is today. Your business would still be struggling, your outlook uncertain, were it not for the great work done by many trade organizations. Now we need one strong, overall lawn and garden association to knit manufacturers, producers and growers into a cohesive group. As President of LAGMA, I promise any time and money you invest in this association will pay off handsomely."

Help develop and support a strong, effective trade association. For information on membership and benefits for your firm, ask Ed Scofield or contact:

LAGMA

THE LAWN AND GARDEN MANUFACTURERS ASSOCIATION
111 East Wacker Drive, Chicago, Illinois 60601 Telephone: 312/644-6610

How Roundup® helped Jim Siegfried renovate this fairway in days, without closing it for one minute.



Take a good look at this good-looking fairway.

Last fall, Jim Siegfried found a way to clean it up, without tearing it up—at the height of his club's busy season. With Roundup® herbicide by Monsanto.

Jim is the Greens Superintendent at Losantiville Country Club, Cincinnati, where bermudagrass had become a serious problem on the 18th fairway. To control it, Jim applied Roundup once—while the weeds were still actively growing—right at the start of the Labor Day weekend.

"That's really 'prime time' here," Jim told us. "But after we applied Roundup, we kept the fairway in play the whole weekend, and after. The members played right over it, with no problem."

Since Roundup has no residual soil activity, and won't wash or leach out of treated areas to injure desirable plants, Jim simply took normal precautions against spray drift—and didn't worry about damaging desirable vegetation along the fairway.

Even better, he was able to reseed right into the dying bermudagrass only 7 days after applying Roundup—without loss of playing time or inconvenience to the membership.

Reinfestation won't be a big problem for Jim, either. He knows that Roundup destroyed the rhizomes of the treated weeds, helping prevent their regrowth.

Jim thinks he'll use Roundup again this year—and apparently some club members hope so, too. "As soon as they saw how good this fairway looks, some of the members started asking when I'm going to do the same for #10, where we have some more bermuda. I'll probably tackle that with Roundup this fall."

If controlling many tough emerged weeds and grasses is a problem for you, see your local Monsanto representative or chemical dealer soon for your supply of Roundup.

Roundup. It worked for Jim Siegfried. It can work for you.

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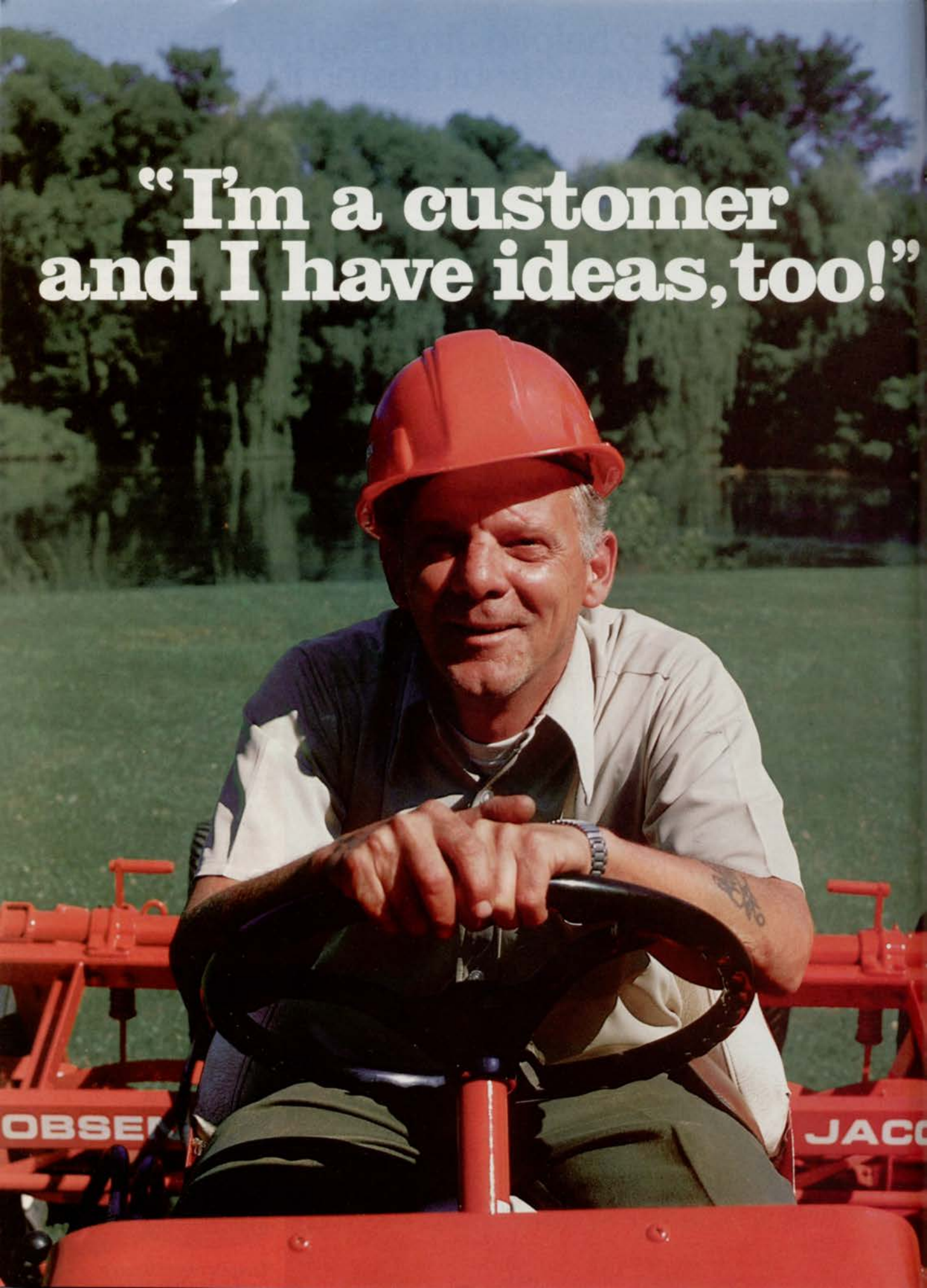
"I'm a customer
and I have ideas, too!"

You don't become the world leader in turf care equipment without paying attention to what people want.

So we listen to our customers. To our distributors. To people who buy our equipment. To people who service it. And to the people who go out under the hot sun and use it.

Then we design our products with new features. Make sensible improvements. And bring out new models.

All to be sure that every product we offer to you is made to match your needs.

And then we back our products with the kind of service and parts inventory to keep the equipment running like it should.

Next time you're ready to order turf care equipment, ask your Jacobsen distributor for his recommendation. And why.

The more you listen to what he has to say, the more you'll know we've been listening.

We hear you.

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GREEN INDUSTRY NEWS

California contractors crack down on theft

Landscape contractors in California are fed up with job site burglary by thieves, "who know what they are doing." To stop the costly problem the California Landscape and Irrigation Council is offering a $1,000 reward for information leading to the arrest and conviction of anyone stealing, vandalizing, or willfully misappropriating property belonging to members.

Trenchers, tractors, irrigation controllers, automatic valves, and plants are disappearing from job sites at an alarming rate. The Los Angeles area is the hardest hit so far, with one contractor losing more than $50,000 in equipment this year.

CLIC Executive Secretary Joe Brazen set the value of stolen equipment and plants at more than $3 million per year. "Our goal is to deter theft," said Brazen. "We've printed posters and decals and members display them all over job sites. Since we've started posting the warnings the incidence of theft has dropped substantially."

Contractors suspect there is a ring operating which steals and resells to unethical contractors, or uses them as an unlicensed contractor. The thieves take items only someone familiar with contracting would know as valuable.

"They know what they want when they break in," John O'Rorke of Pacific Irrigation Supply states. "We can't even replace stolen supplies fast enough to stay on the contractor's schedule."

In a recent front page news story, *The Los Angeles Times* said the losses to landscape contractors are just a portion of the $62 million lost to theft and vandalism at construction sites in California each year. Ben Bartolotto, a member of the California Construction Industry Research Board, said 30 percent of construction sites suffer theft losses.

The "ring" also knows enough to break into warehouses for valves and couplings after taking controllers from job sites.

"The thieves have technical knowledge. They don't use wire cutters, but unscrew valves," said O'Rorke. "They even tape off wire connections and leave the support base with the wire tied off neatly, as if to make it easier to replace."

Insurance fraud is also suspected. Some ethical contractors are being dropped by insurance companies after losses. Others suspect former employees or smaller contractors who got too far in debt. However, no one has been apprehended to date.

Dealing in hot merchandise can backfire, police warn. A fence will sell you hot goods one day, and come later to rob them back, knowing you will not report the burglary.

A non-profit crime prevention group in Sacramento estimates that an average of $1,000 per $50,000 of a home's purchase price pays for losses to theft and vandalism. It all adds up to millions and CLIC has decided it's time to act.

$1,000.00
Reward!

for information leading to the arrest and conviction of any person or persons who steal, burglarize, vandalize, or willfully misappropriate for their own use any property belonging to:

Name of Company

Telephone Number

TREES

Jamboree set for Midwest arborists

A tree trimmer's jamboree featuring competitive events, prize money, and exhibitions will be held at the Morton Arboretum in Lisle, Ill., June 16. The jamboree is being co-sponsored by the Midwestern Chapter of the International Society of Arboriculture and the Morton Arboretum.

Competitive events include a work climb, rope throwline contest, log drop, and chain saw event. Those participating in all four events must pay a $25 entrance fee. A $10 fee will be charged to those participating only in the chain saw contest. Two $500 prizes will be awarded, along with a $150 prize, chain saw, trophy, and medals.

An exhibition of a tree trimmer's equipment will also be featured at the jamboree. Both the jamboree and exhibition are free and open to the public.

To help individuals determine plant values a tree and shrub appraisal seminar will be conducted at the arboretum June 15-16.

Dr. L.L.C. Chadwick, emeritus professor of horticulture at Ohio State University and Dr. James Kielbaso, professor of forestry at Michigan State University, will jointly conduct the seminar.

Only 75 persons will be selected to attend the seminar on a first-come-first-served basis. The registration fee is $50 which includes a noon luncheon on June 16. The fee should be sent to Dr. George Ware, the Morton Arboretum, Lisle, Ill. 60532.

Arborists elect Holkenborg president

The membership of the National Arborist Association, Inc., has elected Larry Holkenborg, owner of Holkenborg Nursery in Sandusky, OH, as president for 1979.

Holkenborg said he intends to

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Introducing the Two-Seater in the Runabout line.

Now, one of the most useful vehicles on your turf grounds is even more useful.

We've redesigned the Cushman® 18-hp Runabout vehicle and made room for two men, plus tools, equipment and supplies. So now, when the job requires an extra pair of hands, the Runabout brings them along.

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And you get a total time- and money-saving vehicle that helps you stretch your manpower dollars. The Runabout lets you move men, tools, materials, and equipment around your course quickly and economically.

Ask your Cushman Turf dealer to tell you more about the 12-hp one-seater or the 18-hp two-seater Runabouts. Or write us direct. And find out how we put two into one, and came out with twice the value.

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focus on "employee development". Responding to a shortage of trained personnel, the Association will encourage development of two- and four-year college programs in tree care and orient more high school student to careers in arboriculture.

Other elections which took place at the Association's recent meeting in Newport Beach, CA, are:
First Vice President Bruce M. Walgren, Walgren Tree Experts, West Hartford, CN.
Second Vice President Walter Money, Guardian Tree Experts, Inc., Rockville, MD.
Secretary Erik Haupt, Haupt Tree Co., Sheffield, MASS.
Treasurer Lee Lesh, Lee's Tree Surgeons, Saratoga, CA.

Board members elected were Robert Mullane, Alpine Tree Care, White Plains, NY; George Tyler, Consolidated Utility Equipment Co., Amherst, NH; Neil Engledow, Mid-Western Tree Experts, Indianapolis, IN; and Robert Bartlett Jr., F.A. Bartlett Tree Expert Co., Stamford, CN. Ken Kirk, Shield Shade Tree Specialists, Clayton, MO is past president.

SOUTHERN TURF

Centipede shade tolerance matches St. Augustine

Preliminary research by Dr. Earl Barrios, Jr., at the Louisiana Agricultural Experiment Station in Baton Rouge indicates that Centipede grass is as shade tolerant as St. Augustine grass.

In the three-year study centipede grew better in dense shade than Floratam and St. Augustine and as well as zoysia. St. Augustine has been damaged by a virus, St. Augustine decline(SAD) in much of the state. Barrios also noted that the centipede was not affected as greatly by chinchbugs, but is prone to Brown Patch disease like St. Augustine. The centipede did withstand low temperatures better than the St. Augustine.

EQUIPMENT

Jacobsen sells assets of Sod Master to Turfco

Turfco Manufacturing Inc., Minneapolis, MN, has purchased the assets of the Sod Master division of Jacobsen Manufacturing Co., ac-

Continues on page 19

Landscape Contractor News

Students compete at ALCA Field Day

More than 250 students from seven colleges faced off at Texas Tech University in March in a series of competitive events. Surveying, plant identification, landscape design, cut and fill estimating, back hoe operation, sales, business problem solving, trenching, tree climbing, and cross-cut sawing were the events. Students from Texas Tech, Mississippi State, Ohio State University, Ohio Agricultural Technical Institute, Richland College, and Oklahoma Tech were the contestants.

Texas Tech, with a home court advantage, grabbed the lead, Mississippi State claimed second, and Ohio State and Oklahoma State tied for third.

Texas Tech advisor Ron Smith said the great participation indicated increased interest in programs which teach the new generation of landscapers.

Landscape business growth expected

According to a survey taken by the National Landscape Association, managers of landscape businesses expect 1979 growth to match last year's growth with the exception of commercial renovation work.

Based upon survey data, landscape business should increase between 15 and 20 percent nationally in 1979. On a regional basis, the Pacific Coast landscapers expect nearly 30 percent more business this year. On the low end, landscapers in the western plains expect only an 11 percent gain. Managers in the Southwest predicted a 20 percent gain. Greak Lakes, Northeast, and Southeast managers all anticipate a 15 percent rise.

NLA qualified the response by saying that the survey is characteristically conservative and said 1978 estimates were lower than the actual results by five percent.

The commercial renovation market seems depressed however, especially in the Southwest. The Great Lakes region expects less growth in new commercial as well. Residential work seems to remain strong for both new and renovation work, with only a slight overall drop. Commercial work must reflect economic problems more than residential.

Disaster information service strengthened

The Council of Tree and Landscape Appraisers has beefed up a "Rapid Response" program to inform the public how to recoup financial losses from damage to landscapes caused by natural disasters.

Rapid Response sends news stories to media in affected areas so that the media can inform the public how they can recapture some of the financial losses incurred when plants and landscape are damaged by storms. The service also directs the public to tree, nursery, and landscape professionals for advice and counsel.

Although a service of CTLA, the program is supported by the American Association of Nurserymen, American Society of Consulting Arborists, Associated Landscape Contractors of America, International Society of Arboriculture, and the National Arborist Association.

Paul Dawson, director of communications for CTLA, said the "Rapid Response" phone numer (202/347-8219) is distributed to members of all five associations. "They post it somewhere to remind them to phone the Council if an event which damages trees and landscape strikes their area."

"When somebody phones us we immediately prepare a press release which is sent by mailgram to most of the media in the affected area," Dawson added. "The story tells the public how to arrange to get an appraisal from a landscape professional, how to deal with their homeowner's insurance . . ., and how to approach the tax loss situation."

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The Number One Controlled Release Nitrogen Fertilizer

CIL Sulphur Coated Urea is being tested against other controlled release nitrogen fertilizers at 14 different universities in the U.S. and Canada. Photo above shows one of the test sites with CIL Sulphur Coated Urea treated grass in foreground.

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- Release of nitrogen is controlled by moisture. Temperature and bacterial activity are not important factors. Excess moisture however, **does not** markedly speed up the release of the nitrogen.
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CIL Sulphur Coated Urea prills actual size.

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- Tested on grass plots under scientifically controlled conditions, CIL Sulphur Coated Urea outperformed all conventional slow release nitrogen fertilizers tested, in both the appearance and growth of grass obtained.
- CIL Sulphur Coated Urea releases nutrients as soon as it is applied and continues to do so evenly over 4 to 5 months. Result is more complete utilization of nitrogen applied, and no build up of nitrates in the soil.

Economical

- Low cost per unit of controlled release nitrogen.
- Available in bulk **or** in 55 lb plastic bags.

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Please advise who can supply me with blended products made with **CIL Sulphur Coated Urea.** ☐

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Daconil 2787

Daconil 2787 is the broad-spectrum fungicide that helps you fight such problems as dollar spot, gray leaf spot, large brown patch and red thread. Easy to handle with great flowability. Disperses quickly in the spray tank. Effective even in hot weather. Daconil 2787 also provides effective disease control on a number of ornamentals. Now in a new 500 g/l formulation.

Diamond Shamrock gives you all the help you need for weed problems, too.

Dacthal® is the preemergence herbicide that controls more than 20 weeds and unwanted grasses. Stops early and late germinating weeds without affecting healthy, growing turf grasses. Tough weeds like crabgrass and Poa annua can't stand up to Dacthal.

Dacamine® gives postemergence control of over 70 broadleaf weeds including dandelion, annual chickweed, knotweed and Canada thistle. Kills 'em right down to the roots so they won't come back.

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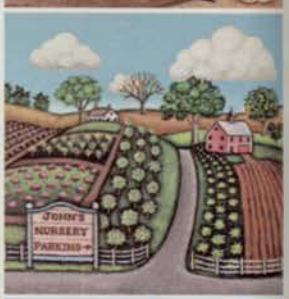

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New *from page 14*

cording to Turfco President Bill Kaercher.

The Sod Master line includes the Metermatic Topdresser for golf greens, the Edgerrite sandtrap edger, the Sub-Air aerator for deep aerification, the Bantam sod cutter for small sod nurseries, and the Pipe Piper vibratory wire and pipe installer.

Jacobsen bought Sod Master in 1969 and merchandised the line through its distributors. Turfco purchased Sod Master prior to the recent purchase of Jacobsen by Textron. The Sod Master name, production facilities, and many of the distributors will remain the same. The color of the equipment will be changed to deep brown and light tan.

Kaercher said changes will include new distributors and new products, including a topdresser for the EZ Go truck. Turfco's address is 3456 Washington Ave., Minneapolis, MN 55412.

GOLF

Alexander to manage Sea Pines golf courses

Dr. Paul Alexander, a specialist in golf agronomy, has been named vice-president of golf at the Sea Pines Plantation Co., Hilton Head, S.C. Alexander had previously been with Sea Pines from 1973-1974 as staff vice-president for agronomy.

After receiving his Ph.D. from Ohio State University Alexander served on the botany and plant pathology staff at Clemson University until 1969 and headed Clemson's turfgrass management program.

Before joining Sea Pines in 1973 he had been director of education for the Golf Course Superintendents Association of America.

A native of Akron, Ohio, Alexander received his bachelor of science degree in horticulture from California State Polytechnic College and a master of science degree in botany and plant pathology from Ohio State University.

HORTICULTURE

Independent nursery survival topic of Pacific show

Charles D. Greenidge, prominent management consultant for the lawn and garden industry, will be the seminar speaker at the Pacific Horticultural Trade Show, September 6-8, at the Long Beach Convention Center. He will discuss the "Survival of the Independent Nursery and Lawn and Garden Retailer."

Greenidge has conducted lawn and garden management seminars across the United States and has also directed several national surveys sponsored by the Lawn & Garden Distributors Association.

The show is being sponsored by the California Association of Nurserymen. For further information contact trade show manager Richard C. Staples, 1419 21st Street, Sacramento, CA 95814 or call (916) 443-7373. For hotel information call the Long Beach Convention Center Information Bureau at (213) 436-3645.

GOVERNMENT UPDATE

Timing of Silvex suspension inconsiderate

EPA's Deputy Administrator Barbara Blum said 2,4,5-T was banned recently to protect citizens from another spring exposure, but it also caused retail nurserymen to get stuck with brand new inventories.

The emergency ban came after most businesses had ordered and received 2,4,5-T products, but before they could sell any of it. Storage space, often critically short, is occupied with products that can't be sold for a period through August at the shortest.

Criticism of the chemical, brought mainly by instances of disruption of pregnancy near forests treated with 2,4,5-T, has been voiced for a considerable length of time. Had there been real question about the chemical's safety, an early suspension could have saved businesses from wasted inventory expense and storage space.

2,4,5-T hearings begin, three judges involved

In an unusual move, EPA has assigned three administrative law judges to hear representatives from 30 firms defending continued use of 2,4,5-T and opponents. Usually one judge is involved, but EPA says three judges were needed due to the volume of information to be heard and the complexity of the overall situation.

The judges must make a decision by July, and EPA Administrator Costle must announce his decision by August. Until then, the products remain on emergency suspension.

A federal court in Flint, Michigan, denied a request by Dow Chemical Co., to lift the ban on some products containing 2,4,5-T.

Alternatives to Silvex described

Margaret Herbst of the New York State Nurserymen's Assoc. has released a list of substitutes for 2,4,5-T for use until the suspension is resolved. They are Am Chem's Super D Weedone, Acme's Weed No More, and Spectrum 33 Plus by Ciba Geigy Corp.

Disposal guidelines stepped up

Embarrassed by national television coverage of problem toxic chemical disposal sites, EPA is stepping up its effort to watch over all old and new hazardous material dump sites. Deputy Administrator Barbara Blum announced that efforts will be made to speed up a plan to monitor and enforce disposal regulations in hazardous waste dump sites. Currently, the program was not expected to take effect until next year.

Blum estimated there are 800 known hazardous waste dump sites, and thousands of unknown older sites which need checking. Blum has requested more money and more lawyers to bolster enforcement activity.

INTEGRATED CONTROL STRATEGIES ESTABLISHED FOR TREE INSECTS

by David G. Nielsen, Ph.D., Project Leader, Woody Ornamentals Laboratory, Department of Entomology, Ohio Agricultural Research and Development Center, Wooster, Ohio.

Integrated Pest Management (IPM) is a current and popular approach utilizing pest control techniques that optimize production or maintenance efficiency while minimizing adverse environmental side effects.

Insect Pest Management is the segment of Integrated Pest Management dealing only with insects and related organisms.

During the past two years President Carter has endorsed and encouraged pest management techniques that emphasize use of parasites and predators, disease organisms of pests, resistant varieties, and so-called third generation pesticides, including insect sex attractants, insect hormones, and other novel chemical compounds. Agriculture Secretary Bergland has stressed the importance of replacing conventional organic pesticides with more ecologically acceptable tactics.

The U. S. Environmental Protection Agency is encouraging research designed to discover and develop alternative pest control strategies. They are doing this in two ways: (1) funding research dealing with novel approaches to insect control; (2) minimizing registrations of conventional pesticides.

IPM is not new but was abandoned by many producers and landscape managers with the advent of petroleum based synthetic organic pesticides in the 1940's. IPM was once a necessity for minimizing losses due to pests. Today, IPM is an approach to improve efficient use of all available tactics, including conventional pesticides only when necessary. Most of us agree that conventional pesticides will be critical components of IPM programs in the foreseeable future.

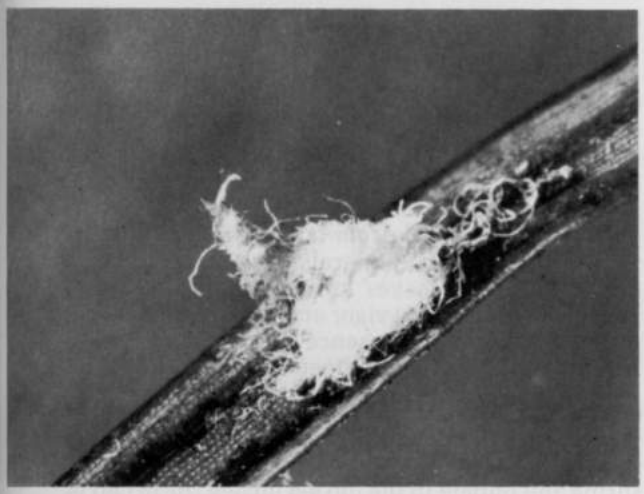
In order to implement IPM on most commodities, certain thresholds must be established. The economic threshold is the population level that will cause economic damage if it is allowed to increase. The economic injury level is the population that will cause more dollar loss than that incurred by applying a control measure. Sampling procedures must be developed to economically determine when these thresholds are reached. Finally, an attempt is made to predict future pest populations and coincidental dollar or esthetic loss based on past and present information (a process called modelling). With all of this background, we then attempt to implement the most cost-effective tactics with minimum adverse impact on ecosystem stability and environmental quality.

Few programs have been developed to optimize control efficiency against pests of trees and shrubs. However, Insect Pest Management can be implemented against some of the most common and destructive pests of woody ornamentals in the landscape and the nursery. A few examples are presented here to illustrate how these strategies are formulated based on thorough knowledge of the pests involved and tactics available for combating them.

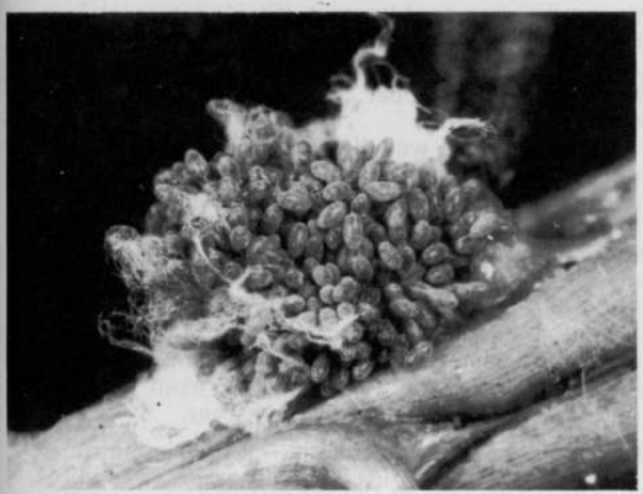
Spruce Gall Adelgids

In the March 1975 issue of Weeds Trees & Turf, Dr. R. L. Campbell, WWREC, Puyallup, WA, proposed to change the common names of insects in the subfamily Adelginae from aphids to adelgids. His recommendation was recently approved by the Committee on Common Names of the Entomological Society of America. Consequently, the new name for spruce gall aphids is spruce gall *adelgids*. Adelgids are more closely related to grape and hickory phylloxera than they are to aphids. The old common names led many people to use aphicides in an effort to control adelgids. However, control was rarely satisfactory because many aphicides are relatively non-toxic to phylloxerans, including spruce gall adelgids.

Eastern Spruce Gall Adelgid. The eastern spruce gall adelgid, *Adelges abietis* (L.), attacks primarily Norway and white spruce and causes pineapple-like swellings or galls to form at the base of new



Norway spruce (left) with Eastern spruce galls. **Egg mass** (below) of Eastern spruce gall. **Waxy filaments** of Cooley spruce gall (above) repel spray droplets.



twigs. This adelgid was imported from Europe during the 19th century and subsequently has spread throughout North America wherever hosts are planted. It overwinters as a dormant stem mother with its mouthparts inserted into the twig at the base of a bud. The following spring, overwintering adelgids mature and lay eggs just prior to budbreak. Adelgid crawlers hatch and begin feeding at the base of bursting buds. As the new shoot and needles grow, They are stimulated by the adelgids to produce a basal swelling that eventually forms a closed gall with many chambers. Feeding by both the stem mothers and their progeny is required for normal gall formation. In late summer the succulent green galls begin to dry out and turn brown. Soon the chambers split open, and the nymphs migrate to needles where they molt to the winged adult stage. All of the individuals are females that produce viable eggs without mating. Crawlers that hatch from these eggs are the overwintering stem mothers that produce the next, annual generation. This scenario, including galling, occurs each year on Norway and white spruce.

Cooley Spruce Gall Adelgid. The Cooley spruce gall adelgid, *Adelges cooleyi* (Gillette), causes pineapple-like swellings at the apical ends of twigs on Colorado blue, Engelmann, and white spruce. This pest produces life forms that migrate to the alternate host, Douglas-fir. On Douglas-fir the adelgids feed on the undersides of leaves where they cause chlorosis and leaf distortion and sometimes premature needle drop. Galling does not occur on the alternate host. Most authors who have studied Cooley spruce gall adelgid have indicated that galls are not formed year after year on spruce unless migrants immigrate from Douglas-fir.

Choosing Suitable Tactics. Although galling caused by spruce gall adelgids is not a threat to tree survival, heavily infested trees are unsightly and often more of an esthetic liability than an asset in the landscape. Nurserymen must minimize galling because infested trees cannot be shipped in interstate commerce.

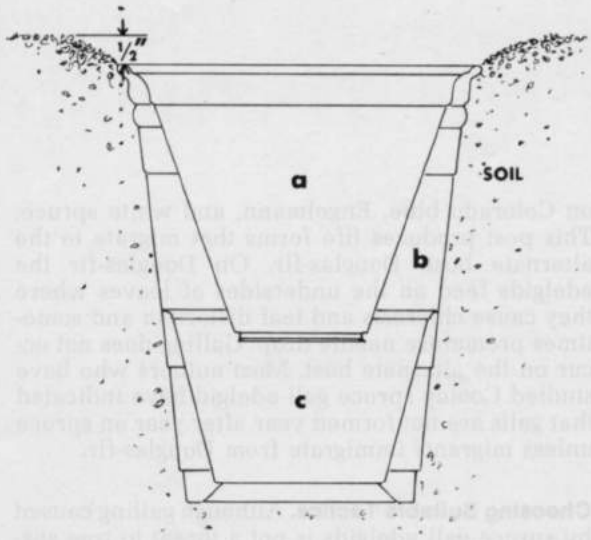
Several tactics can be employed to minimize galling on spruce trees. Individual landscape managers can choose those tactics which best fit their management practices and goals.

An obvious tactic to minimize terminal galling on Colorado blue, Engelmann, and white spruce is to not plant Douglas-fir nearby. Although we do not know how far migrants can disperse and still survive, crawlers have been trapped more than a mile away from the closest conifer planting. Consequently, if spruce are used on a golf course or cemetery, Douglas-fir should not be planted. The same logic applies to nurserymen and Christmas tree growers. If you plan to grow both Douglas-fir and susceptible spruce, expect annual galling on spruce and increased production costs.

The most common direct control method for spruce gall adelgids is a thorough application of hydraulic, insecticidal[1] spray, after stem mothers are established in late summer and before they begin egg production the following spring. Spraying should be accomplished when temperatures are warmer than 60°F (15>C) and cooler than 80°F (27°C). The level of control achieved is directly related to how thoroughly you wet the twigs where stem mothers are feeding.

Nurserymen and Christmas tree growers who sell live spruce can reduce adelgid populations and eliminate new, unopened galls by pruning them during the shearing operation. This procedure is unnecessary in the landscape, providing trees are inspected annually and an insecticidal spray is applied before galling threatens to reduce aesthetic quality. Fall and spring inspections are effective since galls remain on the trees. Low-level infestations in the landscape neither constitute a pest situation nor justify use of an insecticidal spray, because tree vigor and appearance are not significantly reduced.

Cooley spruce gall adelgid on Douglas-fir can be controlled with a thorough-coverage spray in spring when buds begin to shed their scales. They are also vulnerable throughout the summer whenever they are in a nymphal stage. Adults are often



Pit-fall trap enables detection of first emergence of adult black vine weevil for optimum control.

more difficult to control because they are covered with a white, waxy material.

Another tactic that may be employed in a spruce gall adelgid control strategy is use of systemic insecticides. The insecticide, formulated in a slow-release granule, is applied to the soil surface at the drip line of a tree and cultivated into the top several inches (8-12 cm) of soil. An alternative application technique would be to place the granules in holes or a shallow trench at the drip line. The treated area is watered immediately after application and again in 2 weeks unless there is about one inch (2.54 cm) of rainfall. This tactic, employed in mid-April in northeastern Ohio, has precluded formation of new galls on trees that were heavily galled in previous years.

Union Carbide Corporation is currently pursuing a special local needs, 24C, registration for Temik 10 G (aldicarb) for this usage in Ohio. I believe it is an excellent alternative to foliar sprays because it (1) eliminates drift of toxic materials, minimizing contact with non-target organisms, including man, and (2) it *eliminates* galling. If used on an area-wide basis, annual application would not be required. Indeed, once an infestation is eliminated, galling will not recur until an infested tree is moved to the area.

In the future, spruce trees resistant to adelgids may be available. Dr. D. B. Houston, OARDC, is developing resistant Norway and white spruce and investigating the basis for resistance and a technique capable of detecting resistant trees when they are still small. Availability of trees resistant to spruce gall adelgids will dramatically reduce production and maintenance costs associated with spruce.

Black Vine Weevil

The black vine weevil, *Otiorhynchus sulcatus* F., was imported accidentally to the United States from Europe more than 100 years ago. It has established itself as one of the most common and damaging insect pests of woody ornamentals and small fruits throughout the northern portions of this country and southern Canada. During the past 10 years its status as a pest has been increasing at an alarming rate.

Damage — Although adults consume foliage, they rarely eat enough to reduce plant health. Instead, the grub or larval stage causes the significant damage. Young larvae consume small feeder roots while becoming established and large larvae eventually strip bark from larger roots, cutting off supply of water and minerals to stems and foliage and sugars from leaves to roots. Extensive larval feeding reduces plant vigor and may cause death of the plant. Weevil presence is commonly overlooked until plants have been seriously damaged.

Life Cycle and Seasonal History — Black vine weevil overwinters in the larval stage near the root zone of host plants. Larvae resume feeding in spring and pupate in the top 4-6 inches (10-15 cm) of soil during May, June, and July. Adults usually begin emerging at the end of May in northern latitudes (Cleveland area); about 3 weeks earlier in the southern parts of its range (Cincinnati area). In the north, they continue to emerge through early August; egg laying begins in early July and continues through October. Only large larvae overwinter successfully.

All black vine weevils are females that reproduce without mating, a phenomenon called parthenogenicity. Newly emerged weevils must feed about 4 weeks before their eggs develop. Since they are flightless, they feed and lay eggs near their emergence site, and oviposition continues throughout the summer. One female may lay 1000 eggs during her life time. Consequently, a dense and damaging population can develop in a localized area in only a few years, even though there is only one generation each year.

Developing a Control Strategy — Dieldrin, aldrin, and chlordane were used as foliar sprays to kill adults and as soil treatments in an attempt to kill larvae until the early 1970's. Although some pest control operators reported good results with soil treatments, established larval infestations have always been difficult to control. Since these insecticides have been banned[2], and other soil insecticides have not proven effective against black vine weevil larvae, we must rely on foliar sprays and drenches to kill adults before they begin production.

Detecting Adult Emergence. The first step in implementing a black vine weevil pest management strategy is determining when adults begin to emerge in spring. Although we know emergence begins about June 1 in northern Ohio, accurate local information can optimize the strategy. If a dense infestation has been located, pit-fall traps[3] can be installed to detect first emergence. Traps should be inserted in the ground so their upper lip is just beneath the soil surface in a location near infested plants and convenient for frequent inspection. Traps should be installed at least 2-3 weeks before emergence is expected and checked at least weekly. RECORD FIRST TRAP CAPTURE ON YOUR CALENDAR.

Timing First Spray. The first insecticidal spray should be applied 3 weeks after the first weevil is

Continues on page 25

Orthene doesn't give insects a fighting chance

ORTHENE® TREE AND ORNAMENTAL SPRAY is a truly remarkable insecticide that destroys destructive worms with incredible efficiency.

Specially recommended for use on landscape trees and shrubs, ORTHENE kills gypsy moth larvae, bagworms, spring and fall cankerworms and, on oak trees, California oakworm larvae.

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detected. Remember, weevils must feed about 4 weeks before they can produce eggs. Consequently, effectiveness of a single spray can be maximized and the number of sprays required to achieve excellent control can be reduced by allowing emergence to continue for 3 weeks before application. Some leaf notching will occur, but the weevils will be killed before they can reproduce.

If you are unable to determine when emergence begins in your area, you may be forced to make the first application based on calendar date. Emergence begins about the first of June in the northern half of New York, Ohio, and Illinois, and 3 weeks earlier in Philadelphia, Cincinnati, and St. Louis. In northern localities, first application should be made about June 20; in more southern areas about June 1.

Repeat Application Required. The second application should be applied 3 weeks after the first spray has lost its effectiveness. Some insecticides have been surprisingly persistent in our studies of black vine weevil control. However, this persistence may be associated with use of taxus, a plant with a thick waxy leaf surface. Consequently, until we know that a material persists more than a few days reapplication should occur 3 weeks after first treatment [= 6 weeks after first adult emergence). If this spray interval is followed, a third application will be required 9-10 weeks after first application, because adults sometimes continue to emerge through early August.

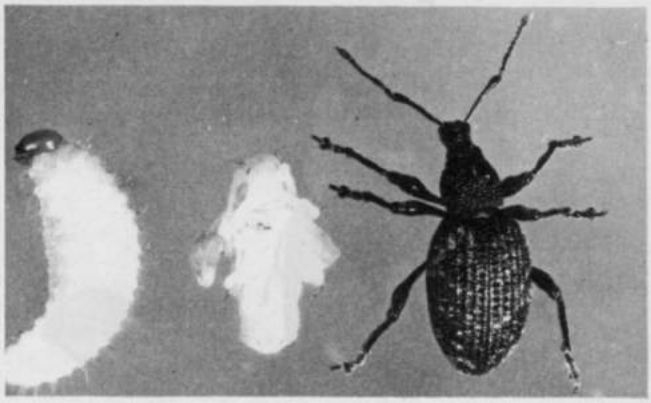
State Registration. Growers and pest control operators in Ohio are taking advantage of a state registration for use of Guthion 50 WP at 0.5 pounds of active ingredient per 100 gallons of water to control black vine weevil adults. Guthion persists at least one week, so re-application is not required until 4 weeks after first application.

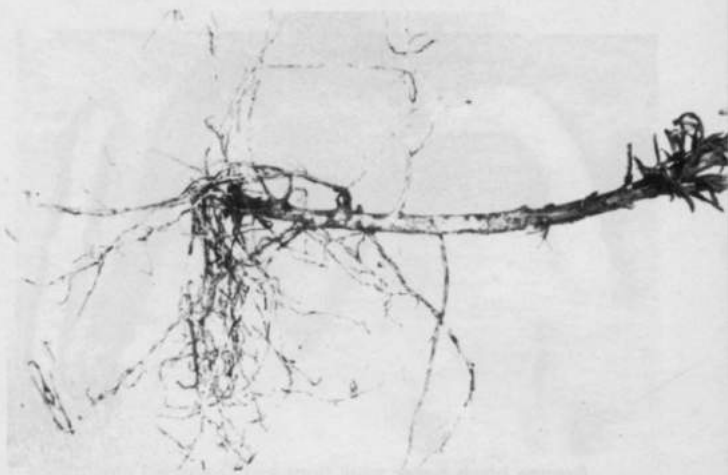
Ortho Division of Chevron Chemical Company is in the process of receiving a national label for Orthene Tree and Ornamental Spray for black vine weevil control. Orthene is as toxic as Guthion to black vine weevil adults, but must be used at 3 week intervals, because it persists for only 2-3 days. Orthene's short persistence and low toxicity to man and other mammals enables its usage in the landscape by both pest control operators and homeowners.

An adult strategy, based on detection of first adult emergence and application of an appropriate insecticide at specified intervals can be used to prevent black vine weevil infestation and/or reinfestation. This approach is critical to black vine weevil pest management, because established larval infestations are impossible to control with insecticides at this time. Remember, success of a black vine weevil adulticide program is directly related to *proper timing* and *thoroughness of coverage.*

Borers

Borers comprise another damaging group of insect pests on trees and shrubs. Larvae destroy tissues in which food and water move, and they construct galleries that weaken trunks and branches. Furthermore, larvae operate beneath bark where they are invulnerable to insecticidal sprays. Consequently, borer control strategies must rely upon preventing larval establishment beneath bark.





Black vine weevil life stages (top), left to right; larva, pupa, adult. **Root damage** by black vine weevil larvae (above). Larvae consume small feeder roots and strip bark from larger roots.

Most borers are beetles or moths in the adult stage. Common beetle borers include, bronze birch borer, flatheaded appletree borer, red oak borer, and locust borer. Carpenterworm, lilac/ash borer, lesser peachtree and peachtree borers, and dogwood borer are moths when adults. Most authors who have studied borers have reported that trees in poor vigor are most susceptible to borer attack and damage.

Life Cycle and Seasonal History — Borers overwinter as larvae in galleries beneath tree bark. The following spring or summer they complete development, pupate, and emerge as adults, if there is one generation per year. Some borers require more than one year to complete development. Mating occurs soon after emergence, followed by egg laying on or in bark or on plants growing near host trees. Larvae hatch within 2-3 weeks and chew their way beneath the bark where they remain until mature.

Developing a Control Strategy — The most important and effective approach to minimizing borer infestation is to maintain vigorous trees. Consequently, cultural practices including watering, fertilization and pruning should be used to promote tree health. Furthermore, aphids, leafminers and similar pests should be controlled on trees like white birch that are prone to borer attack.

Bronze birch borer adult (top) and D-shaped emergence hole. **Larva and gallery** (above) of the bronze birch borer.

Bronze birch borer, *Agrilus anxius* Gory, attacks apparently healthy white birches and annually kills thousands of trees in the northern United States and southern Canada. This native insect attacks only unhealthy trees in the forest, but is apparently a primary pest of birch in nurseries and landscape plantings. There has been an unconfirmed report that Monarch birch is resistant to this pest; river birch is not attacked.

Lindane is the only insecticide registered for use against bronze birch borer. It should be applied when adults first begin emerging (about June 1 in northeastern Ohio) and repeated at least twice at 2 week intervals. All branches should be thoroughly covered, especially tree tops where bronze birch borer attacks first.

Birches should be irrigated every 10-14 days with about 1 inch (2.54 cm) of water during the summer when rainfall is low. They should also be fertilized annually with a lawn-type, high nitrogen fertilizer. Additionally, birch leafminer and birch aphids should be controlled to reduce chances of trees becoming predisposed to borer attack. Although these procedures may seem overwhelming and costly, the relative costs associated with maintaining healthy trees is low compared to replacing trees killed by borers.

If bronze birch borer is detected when only top branches are infested, corrective pruning and insecticidal sprays may be used to save the tree. All limbs distal to D-shaped emergence holes and sinuate larval galleries should be removed in May before adults emerge. Lindane should be applied in the aforementioned manner, beginning in late May or early June. Although heavily pruned birch will look unsightly for about 2 years, new branches will grow quickly and fill-in the canopy. This procedure has been accomplished with excellent results in Wooster, Ohio.

Clearwing Moth Borers. Last year I wrote an article for WTT explaining how sex pheromone traps[4] can be used to detect presence of clearwing moth borers. When these traps are used according to directions, pest control operators, landscape managers, and others can determine which clearwing borers are present in your local area, when adults begin to emerge, and how long adults continue to emerge. This information can be used to plan ahead regarding need for borer sprays, pinpoint the time when the first spray should be applied, and determine if additional applications are necessary.

Chlorpyrifos (Dursban®) has provided excellent control of all clearwings against which it has been evaluated, including lilac/ash borer, peachtree borer, and lesser peachtree borer. It is probably equally effective against other clearwings, including dogwood borer, rhododendron borer, banded ash borer, and sequoia pitch moth. Although Dursban® is not labeled for use against these borers, I will be asking the U. S. Environmental Protection Agency to approve a general clearwing moth label for it on woody trees and shrubs. If EPA grants this request, the combination of clearwing borer traps and Dursban® should provide a pest management strategy useful for dramatically reducing damage by clearwing moth borers.

Developing Control Strategies — Landscape managers interested in developing Insect Pest Management strategies to optimize control of particular pests or groups of pests should consult their extension entomologist or appropriate publications. Make an effort to learn all you can about the pest's life cycle and seasonal history and the stage(s) most vulnerable to manipulation or control. Determine how tree management practices influence susceptibility or resistance to attack and damage. Learn how to detect presence of the stage that will key your chemical control efforts. Perhaps scouts will be employed in the future to monitor tree health and make prescriptions regarding the what, when, and how of tree management. After all, IPM and Insect Pest Management efforts are designed to improve overall tree health while reducing production, management, and environmental costs. **WTT**

Footnotes

[1] Consult your local county agent regarding insecticides registered for specific uses.

[2] Chlordane may be used for control of black vine weevil until January 1, 1980.

[3] Pit-fall traps are available from Carolina Biological Supply, Burlington, NC 27215.

[4] Clearwing borer traps are available from CONREL, 110 A Street, Needham Heights, MA 02194

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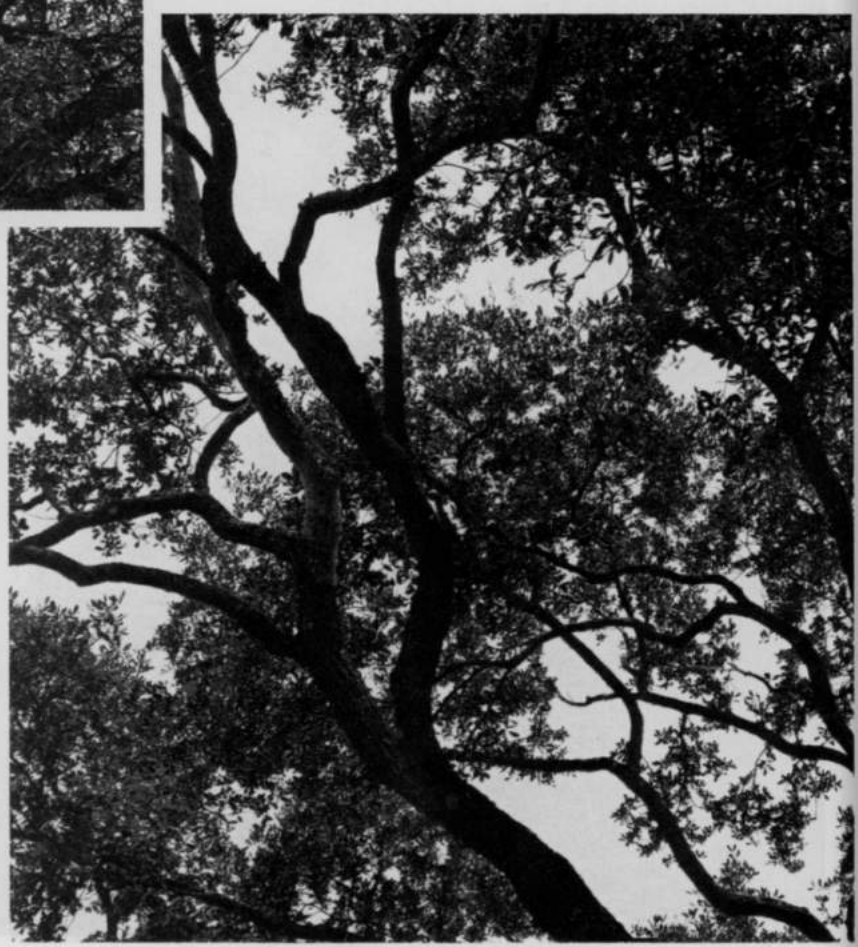
BIRD PEST CONTROL BY TRIMMING FAVORITE TREES SHOWN EFFECTIVE

The original article on this subject, "Nonlethal Blackbird Roost Control", appeared in PEST CONTROL Magazine, September 1978. WEEDS TREES & TURF was created in PEST CONTROL Magazine in July 1962, more than 17 years ago.

Heavy tree trimming can be an effective way to reduce pest bird populations according to biologists at Rice University in Houston, Tx., and Tennessee State University, Johnson City, Tn.

Heidi Good of Rice and Dan Johnson of Tennessee State found that trimming approximately one third of the tree canopy in areas where birds reach pest proportions caused birds to seek other roosting sites. This type of bird control is termed habitat modification.

Good and Johnson studied numerous blackbird species including grackles, cowbirds, and starlings. The birds roost in dense, bushy trees because they offer the most protection from weather and predators. Roosting (the term implies large numbers of birds) is thought to occur as a way for the birds to protect themselves from predators, to gain warmth and reduce exposure to weather, and to es-



Trimming about one third of the canopy of trees favored by birds for roosting causes them to seek other trees to roost in.

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tablish an information center. Any modification to these benefits of dense trees and the birds will seek better roosting sites.

Blackbirds are migratory songbirds and usually are protected by state wildlife regulations. However, losses to agricultural crops at winter roost sites as well as nuisance and health problems caused by their large numbers along migratory pathways make control necessary. Other methods of non-chemical control tried are loud explosive noises and recorded distress calls. In certain emergency situations, detergent-based products to cause overexposure were sprayed on birds at roost sites.

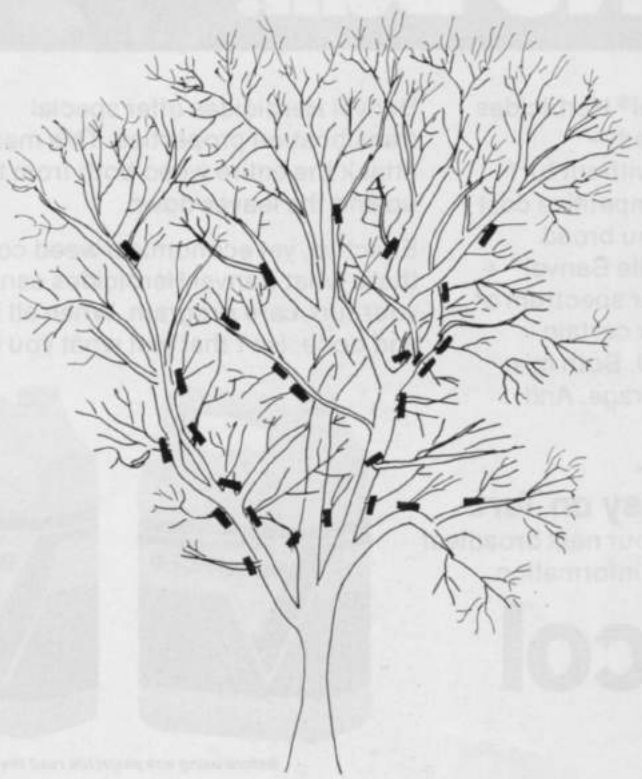
The biggest concern is in urban areas near agricultural croplands where the birds gather in huge numbers.

Good and Johnson noticed that the birds have favorite trees in a grove. Apparently, leader birds select favorites upon arrival. Directing pruning efforts at these trees is the object.

Pruning, or removal in some cases, of these favorite trees should be completed prior to arrival of the birds. Trimming was needed each year for the favorite trees. But, according to Good and Johnson, only enough trees should be removed or pruned to create an open space within the favored site. "Elimination or heavy trimming of favorite trees should discourage birds from roosting in nearby associated trees.

Good and Johnson mentioned one case where dense bushes near an apartment building were pruned back to eliminate a sparrow roost.

The key to control by habitat modification is to find the favorite trees and bushes and prune or remove them. Trimming all trees and bushes should be unnecessary if attention is paid to the favorite trees each year. **WTT**



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CLEARING UP MYSTERIES WILL AID GROWTH OF HYDRAULIC SEEDING

By Bruce F. Shank, Editor

Bowie pull-behind unit in hose operation. The unit requires one person to control the clutch and another to operate the hose.

Manufacturers of hydraulic seeding and mulching products appear to be mounting another charge at growth as reclamation regulations sweeten the market. Even though reclamation is not proving to be the boom market as hoped, other markets such as lawn care are keeping interest high and bringing needed attention to specifications and mulches.

Highway construction and the Army Corps of Engineers have provided the hydraulic mulch and seed manufacturers with their business mainstay since the forties when the first hydraulic seeders and straw blowers were introduced commercially. For the past decade there have been three makers of equipment (Bowie, Finn and Reinco) and two national distributors of mulch (Weyerhauser and Conwed). These five firms have been and still are the foundation of the market.

But their market is being challenged on both equipment and mulch fronts. Strong Manufacturing of Arkansas and Electric Technology of Washington have released hydraulic seeding devices this past year.

New companies selling mulch on a national scale have come chiefly from the cellulose insulation business. They include Cellin of Virginia, International United Chemical Co. of Los Angeles, and Fibrex Corp. of Kansas City. Strong Manufacturing is planning to enter the mulch market this summer with a paper mulch.

There are others who have existed on a more regional basis. They include Superior and Grass Growers in New Jersey, Grass Fiber Inc. and Jacklin in the Northwest, Cal-Fiber in Los Angeles, and Fibre-Therm in Ontario, Canada. There are many others who convert urban byproducts into mulches for the area around them.

Organizations such as the International Erosion Control Association (IECA), The Associated Landscape Contractors of America ALCA, and the Soil Conservation Society are putting more emphasis on hydraulic seeding and mulching in their programs. Their members are raising questions about basic problems with state and private specifications, application rates, application methods, and products.

These questions should be answered before the market gets so confused and uncertain that architects will exclude hydraulic mulching from specifications and revert to blown straw.

Getting answers means objective research is needed. At the present time there are only two or three persons active in university research of hydraulic mulches and equipment in the U.S., Burgess Kay at the University of California, Davis, and R.E. Blaser at Virginia Polytechnic Institute, Blacksburg. Their research has been limited in many cases to small plots and sometimes artificial environments designed to resemble real conditions.

Bob Fischbach, secretary treasurer of the IECA,

told *Weeds Trees & Turf* that the Association has now enough funds to start supporting research. Hopefully other gifts to research can help these researchers develop programs large enough to make field test comparisons of all products currently on the market. Industry associations, armed with this objective data, can police promotion of industry products for accuracy.

Products

Most of the suspicion is over mulches. The equipment manufacturers naturally feel their equipment has advantages over their competition. But for the most part, they have all been doing a good job when properly used.

Mulches on the other hand are used in great volume. Consistent grind and quality are important when used in hydraulic seeders.

According to Blaser, mulches are used to control erosion and dust during construction and to assist establishment of seedlings. They control erosion by preventing rain drops from breaking down soil particles and plugging up pore spaces with small sandy and silty materials. They assist establishment of seedlings by moderating soil temperature and improving water infiltration.

Straw, hay, wood bark, wood chips and wood fiber are the best mulches Blaser says. Kay has reported that in rainfall tests paper performed well on a 1:1 slope and increased the effectiveness of wood fiber in a half and half mix. Other mulches on the market consist of different types of paper, processed straw, and treated byproducts of the seed industry.

Costs, slope, application procedures, location, and additives make any of these mulches best for certain conditions. There is a place for straw, which tends to be cheapest at approximately $100 per acre, and hydraulic mulches which can cost from $400 to $600 per acre.

"When you get into highway cut that is 200 ft. tall and 1½:1 slope, or you get into a housing project where you've got to have immediate ground cover hydromulching shines, Fischbach says. "But if you can get in there with a wheel tractor, drill seed, blow down straw, and crimp it in, hydromulching makes less sense."

One advantage of hydromulching is it can be a one-step process. A slurry of seed, mulch, fertilizer and binder can be applied all at one time. However, at normal application rates of 1,500-3,000 lbs. dry matter per acre, even large tank hydraulic units have to be refilled every 15 minutes.

Another way is to hydroseed with seed and fertilizer, and then blow on straw. On steep or windy slopes a binder might need to be applied over the straw.

Norm Krisburg of Reinco has linked efficiency of one- and two-step methods with the size of the

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job. Krisburg says that once a job gets over four acres, the two-step method is less costly, even though a straw blower is needed in addition to a hydraulic seeder or mulcher. Walter Reinecker of Reinco says, "Invariably, if someone buys a hydrograsser from us and contemplates a full-time mulch business, he will come back and buy a straw blower in two to three years."

Blaser suggests this combination; 3000 lbs. straw per acre blown on and overseeded with a seed, fertilizer and wood fiber slurry at 700 lbs. per acre. The wood fiber binds the straw to the soil and according to Blaser, is superior to any of the binders or tacking agents. He adds that such an application can last through the winter on slopes of 1½:1. This would be the Cadillac and too costly for some projects.

Specified rates characteristically are higher on the West Coast than on the East Coast. "Fiber on the West Coast has nearly always been specified at a ton an acre," says Reinecker. "When fiber was first introduced to the East Coast, specs were set at 700 lbs. per acre. East Coast suppliers wanted to be competitive with hay or straw and fiber mulch cost $100 more per ton on the East Coast due to shipping costs from the West Coast. The 700 lbs. rate was too low and now most specs range from 1,200 to 1,500 lbs. on the East Coast.They are reaching 3,000 lbs. on the West Coast."

Paper mulches can be produced wherever large amounts of paper are used and therefore aren't as tied to shipping costs. Much of the strategy of the new mulch companies is to eliminate long haul shipping costs by setting up plants in regional centers. This will probably force down mulch prices for a period of time. Single plant companies warn that product quality can vary with regional plants.

Mulches may vary according to additives. You can buy basic mulches and add your own binders, surfactants, and fertilizer, or you can buy premixed versions. Binders do vary and this is one area where some research could help. Experts will say that fertilizer content should depend upon soil tests. Fibrex contains something called a "growth stimulant," but a spokesman for the company said the identity of the stimulant is a trade secret.

Larry Porter of Strong Mfg. said his company has tested certain papers for mulch and found the coating on some paper to have the same effect as a binder. Ernest Gilcrist of Cellin reports paper type does make a differnece.

Rates seem to be climbing to straw rates, 3000 lbs. per acre. If they reach that level, mulches for

Continues on page 36

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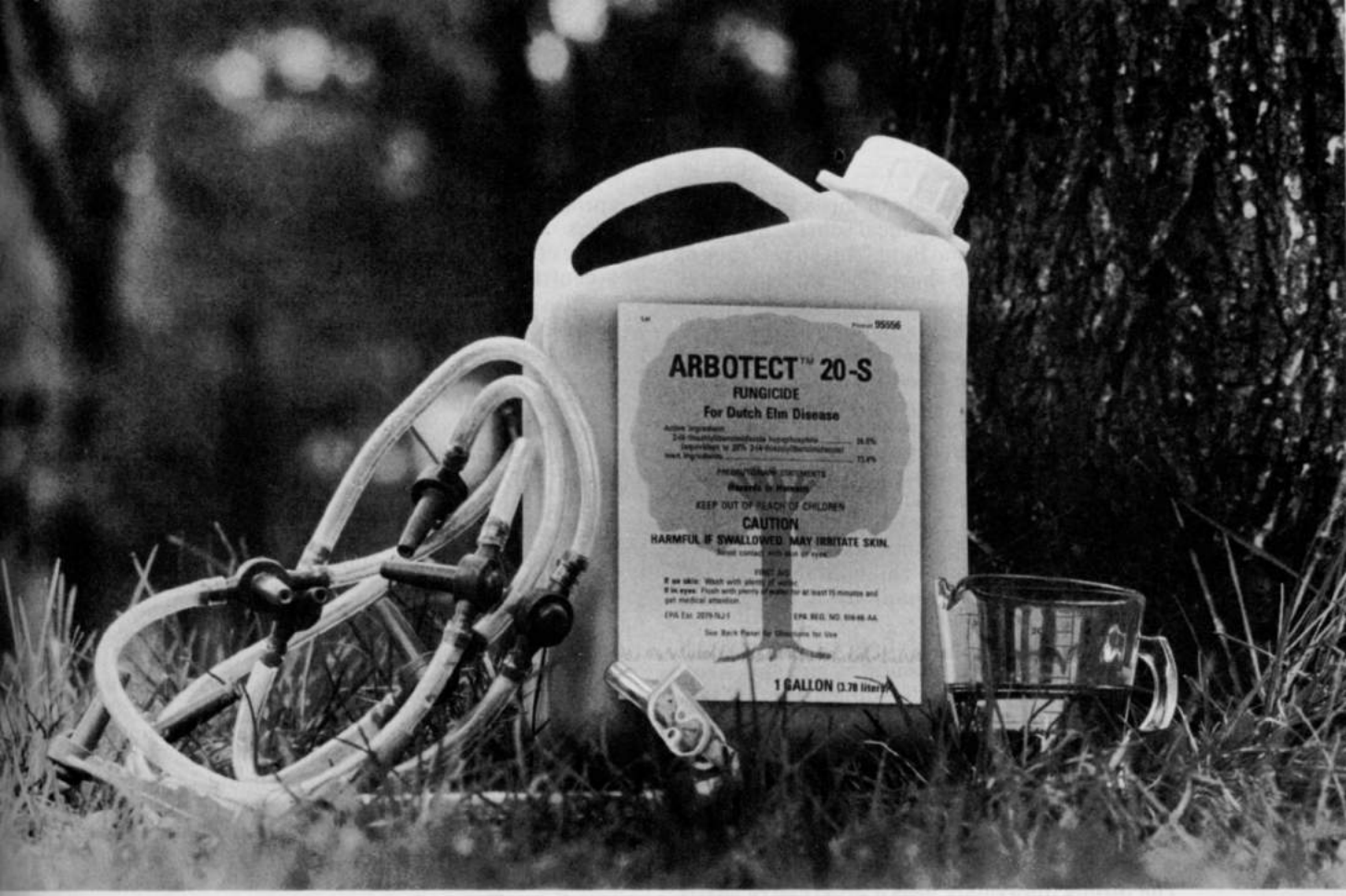

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hydraulic devices will be about three times more expensive than straw from a local source. Shipping costs are rising at the same time. The advantages of hydraulic mulches will have to be clearly established to overcome the cost differential

Krisburg has suggested there is a point of diminishing return on mulch and seed rates. The cost of additional mulch may not justify the added germination.

The differences in hydraulic seeders and mulchers center around pumping and mixing.

The oldest device, the Finn, has both mechanical agitation and recirculation to keep the slurry uniformly mixed. The Finn has a centrifugal pump. A recirculation system has the bonus of valving from the hose end. The operator can control spraying from the ground by a valve on a semirigid hose.

The Reinco has recirculation mixing only. It claims this simplifies the machinery and cuts down on maintenance. However, the Reinco uses a larger centrifugal pump.

The Bowie has a gear pump that can handle heavy slurries and can be used for sprigging as well as seeding. Bowie says seed damage is reduced since seed only goes through the pump once. Without recirculation however, hose end control is not possible. Two men are needed when using a hose.

The Strong Spraymate uses a progressive cavity pump, which is a technology from the cement pumping business. Like the Bowie, material passes through only once. Strong says their machine can handle 1:1 water to solids. It can sprig and is reversible in case of nozzle blockage. The slurry is mechanically mixed.

The Erocon Division of Electric Technology Corp. makes hydraulic seeders and a device called an air seeder. The hydraulic seeders range from 800 to 3,300 gallons and have hydraulically driven mechanical agitation systems. The purpose of the hydraulics is to replace drive belts, chains, and sprockets of standard mechanical agitation systems. There is no recirculation. A diesel engine drives two pumps, one for the agitation system and a centrifugal pump for spraying.

The air pump is a device which combines seed and fertilizer from separate tanks and sprays them out together. The rates of fertilizer and seed can be controlled. The device can spray out 40 ft.

Erocon is also the company that is producing a land imprinter developed by the Forest Service, which imprints reclaimed topsoil to hold water and seed.

Reinco unit features simple, jet agitation without mechanical paddle wheels.

Specifications

When a landscape contractor does business in more than one state, variations in specifications can be a hassle. Highway work specifications are established by the state architect or engineer based to some extent on Federal guidelines. But sometimes you have to wonder why neighboring states have such different specs.

For example, Charles Tennant, chairman of ALCA's Erosion Control Committee, works for both Illinois and Iowa highway departments out of his Rock Island, Illinois office. "Iowa specifications call for 400 gallons of seed and fertilizer slurry per acre, whereas Illinois requires separate applications of seed and fertilizer at 1,000 gallons per acre," says Tennant.

Fischbach says the state architect makes the specifications up based upon his own testing, influence from contractors and influence from suppliers. "Regional climate differences are part of the reason for variance, but not all."

"The contractor always wants to put the least amount of mulch down and the supplier always wants the greatest amount," according to Reinecker.

Lawn Care companies in some regions of the U.S. offer hydraulic liming, seeding, and overseeding as a extra service to customers. Erocon is developing a simplified version of its 800 gallon unit specifically for landscape contractors and lawn care companies.

The reclamation market for surface mines will take longer to develop than originally thought. Lawmaking took considerably longer than expected and enforcement isn't really off the ground in many states. When the questions are resolved and the requirements of the law are made clear, then surface mine reclamation will start to roll. Many coal companies have already established reclamation programs under state law.

Highways, surface mines, and lawn care should provide healthy growth in hydraulic seeding and mulching for the next ten years. The landscape contractor will develop more uses for smaller hydraulic units. A slow-down in the construction industry might soften the effect of lawn construction, but developers may be convinced that hydraulic seeding is a quick and economical way to seed a new subdivision. How hydraulic seeding will compete with sodding is yet to be seen. As in lawn care, a new technology can spell tremendous growth if it works, but it has to work consistently and reliably. **WTT**

Addresses

Associated Landscape Contractors of America, 1750 Old Meadow Rd., McLean, VA 22101. (703) 893-5440.

R.E. Blaser, Distinguished Professor of Agronomy, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

Bowie Industries, P.O. Box 931, Bowie, TX 76230. (817) 872-2286.

Cal-Fiber, 611 S. Anderson St., Los Angeles, CA 90023. (213) 268-0191.

Cellin Manufacturing Co., P.O. Box 224, 9610 Gunston Cove Rd., Lorton, VA 22019. (703) 690-1195.

Conwed Corp., Environmental Products Div., 332 Minnesota St., P.O. Box 43237, St. Paul, MN 55164.

Erocon Equipment Div., Electric Technology Corp., P.O. Box 11062, 5202 S. Proctor St., Tacoma, WA 98411. (206) 475-6100.

Fibrex Corp., P.O. Box 258, Grain Valley, MO 64029. (800) 821-5572.

Finn Equipment Co., P.O. Box 8068, Cincinnati, OH 45208. (513) 871-2529.

Grass Fiber, Inc., 520 E. 2nd St., OR 97448. (503) 998-6812.

Grass Growers, P.O. Box 584, Plainfield, NJ 07061. (201) 755-0923.

International Erosion Control Association, Bob Fischbach, P.O. Box 807, Freedom, CA 95019. (408) 722-5315.

International United Chemical Co., 645 E. 60th St., Los Angeles, CA 90001. (800) 421-5904.

Jacklin Seed Co., Route 2, Box 402, Post Falls, ID 83854.

Burgess L. Kay, Wildland Seeding Specialist, Department of Agronomy, Agricultural Experiment Station, Davis, CA 95616.

Reinco, P.O. Box 584, Plainfield, NJ 07061. (201) 755-0921.

Strong Manufacturing Co., P.O. Box 8068, Pine Bluff, AK 71611. (501) 535-4753.

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Donald H. Steinegger and Kim W. Todd
Extension Horticulturist and Campus Landscape Architect
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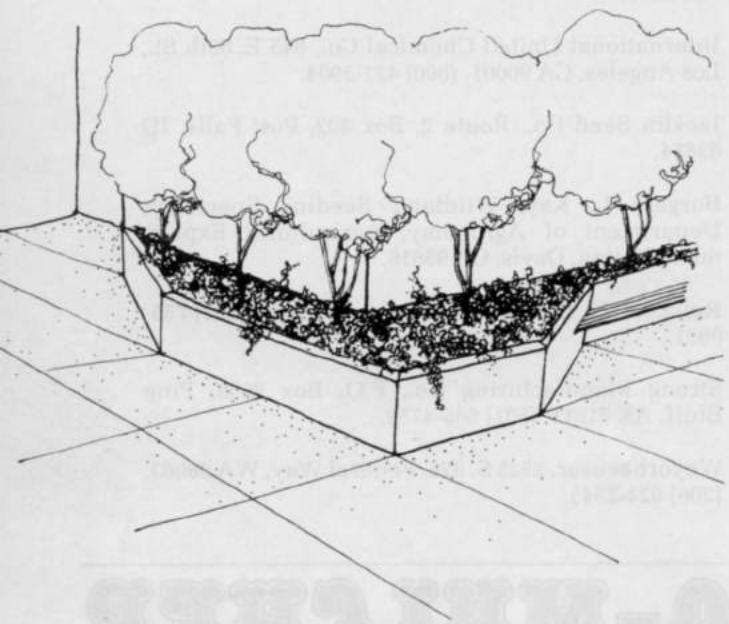
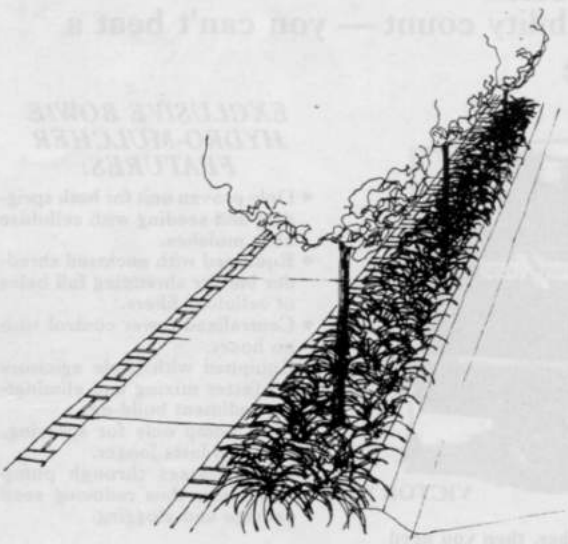


Groundcover eliminates bare ground where mowing is difficult.



Groundcovers unify elements of a planting and provide textural transition.

Strictly speaking, a groundcover is any material which covers the ground, whether it be grass, flowers, plants or mulch. When using a groundcover in landscape design, the term includes any plant lower than three feet in height which, when established, will cover the ground to the extent that underplanting is not required and weeds are excluded.

Groundcovers are associated by many people with a lower maintenance program than that required by turfgrass. This is true only for properly established and maintained groundcover. The initial two to four years demand careful management and in subsequent years a program of pruning, fertilizing, watering and weeding must be practiced in accordance with the species chosen.

In situations where turfgrass is hard to maintain, a groundcover may be the alternative to bare ground or paving. There are groundcovers which thrive in dense shade or intense sun; wet lowlands or dry, rocky soils. On steeply sloping sites where mowing is difficult and erosion control is necessary or where a poor soil structure exists, a groundcover can eliminate mowing and stabilizes the soil. Groundcover can provide continuous greenery or color on urban sites which are either very small or inaccessible for the purposes of the constant maintenance required by turf (for example, raised planter boxes or the open space around street trees). On uneven, rocky sites or walls, a twining groundcover can mask irregularities and cover unsightly land features.

The best reasons for choosing groundcovers over turf involves their design characteristics and aesthetic quality. They may be used to unify different areas of the site, acting as a textured carpet between plantings. Groundcovers act as transition plantings between high maintenance/high use plantings and more naturalized areas, and between turf lawns and taller shrubs. They may define space by leading the eye in a particular direction or reinforcing and dramatizing the shape of the underlying land forms. Finally, groundcovers create a high degree of visual interest through contrast with adjacent surfaces and the surrounding plant materials.

The choice of groundcover for a given situation is based on: (1) the design characteristics being sought — color, form, texture, shape and size; (2) the intended site and function of the groundcover — transition, visual interest, difficult conditions for turf; (3) the hardiness and adaptability of the plant to the area; the maintenance requirements and amount of available care; and, (4) the availability of the plant. A plant under consideration for use as a groundcover should be evaluated on its ability to spread; for its growing habit, which should be relatively neat and uniform; for its size; and, for the ease with which it can be kept in the area designated for it.

Plants which become scraggly and open with maturity do not make good groundcovers nor do those with dense, twiggy structures which become

collectors of blowing paper and trash. Plants which will rapidly outgrow their boundaries or freely self-sow into surrounding sites are best avoided when choosing a groundcover. Shrubs which reach heights greater than three feet or which must be planted close together to make up for their lack of ability to spread are generally not considered as groundcovers.

There are several categories of plants which include species adaptable for use as groundcovers. Herbaceous plants are chosen for areas where their lack of winter vegetations is not detrimental. Examples of these sites would be parking lot islands or street frontages where woody plants could be damaged by snow removal operations. They are usually rapidly spreading and frequently provide interest through brightly colored flowers or variegated foliage. Woody deciduous plants may be chosen over herbaceous groundcovers in situations where a larger size is required, or where the dieback characteristic of the latter is undesirable. They are good choices for transition between lower ground covers and tall shrubs, and provide visual interest through seasonal variation. Evergreens provide green color throughout the year, although if an evergreen is chosen primarily for its green winter color, a taller variety is desirable, since the prostrate tones will be invisible under the snow in the Great Plains area. Because of their uniformity, evergreens serve well as screening materials or as a backdrop for ornamental groundcovers. They are an effective deterrent to foot traffic. They form a very dense mat when established, spreading to cover rocks and soil and shade out weeds. If the proper variety is chosen for the site, they rarely need pruning. Broadleaf evergreens are chosen for situations in which foliage is desired year-round, but an evergreen it not suitable. They may be planted for visual contrast or as a transition between deciduous and evergreen materials.

Herbaceous Perennials

Basket of Gold *(Alyssum saxatile)* reaches a height of one foot with individual plants moderately spreading to one foot. The fine-textured foliage is gray-green. The most notable

Periwinkle
Vinca minor

Japanese Spurge
Pachysandra terminalis

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feature is the bright golden-yellow flower clusters from April through May. Plant in full sun in a well-drained soil. The plant is hardy through most of the Great Plains.

Silver mound *(Artemesia schmilitiana nana)* grows to a height of 8 inches with a spread of 12 inches. Most notable feature is its silver blue foliage. Locate in full sun. The plant is tolerant of droughty soils. Use as an accent plant throughout the central plains. In severe sites protect with a winter mulch.

Snow-in-summer *(Cerastium tomentosum)* forms a dense mat 4 to 6 inches high. The light gray foliage is covered with small white flowers in late spring. Growth is rapid and plant can become weedy. The plant tolerates a hot dry soil which is well-drained. This sun-loving plant should be pruned after flowering to maintain form and density. Hardy throughout the central plains.

Lily-of-the-valley *(Convallaria majalis)* grows to a height of 8 inches in full or partial shade. Fragrant bell-shaped flowers occur in May. This green-foliaged coarse groundcover has a rapid rate of growth, but is easily contained. May not be hardy in hotter, drier parts of the central plains.

Pinks *(Dianthus* species*)* are familiar to every gardener from their fragrant blooms. 'Aqua' forms a dense 8 inch high mat. Fragrant double white flowers form in early spring. Another lower growing cultivar is 'Siberian.' While present cultivars are sparse flowering, the neat compact habit and attractive blue-green foliage make the plant worth considering. Mow off old foliage on both species in early spring. Both plants are adapted over a wide geographical range.

Mock strawberry *(Duchesnea indica)* forms a dense, low mat 4-6 inches high. Unlike strawberry *(Fragaria)*, its flowers are yellow and the bright red fruit are upright thus visible to the viewer. This hardy groundcover tolerates full sun or light shade. Use a mass planting among trees or shrubs in the

central plains. Similar to mock strawberry, Barren strawberry *(Waldsteinia fragariodes)* has yellow flowers, but not fruit. Plant tolerates light shade.

Goutweed or bishops weed *(Aegopodium podagraria variegatum)* rapidly forms a dense mat 8 inches high. This groundcover tolerates shady and poor, droughty soils. Due to its invasive habit, goutweed can become a serious pest. Locate where growth habit is readily controlled. Mow two or three times a year to maintain a uniform attractive appearance. Plant is very hardy and adapted throughout Great Plains.

Cinquefoil *(Potentilla* species) — low growing types — spread rapidly to form a dense mat three to six inches high. Where soils are dry and hot, and a colorful, neat, low-growing groundcover is required, consider this group. *P. verna* grows to 3-6 inches high with one-half inch flowers of bright yellow. *P verna nana* forms 3" mounds. *P. tridentata* has white flowers in midsummer, dark shiny green leaves on the upper surface and is a taller, coarser groundcover than *P. verna.*

Speedwells *(Veronica* species) form a mat four to six inches high. Attractive blue to bluish rose flowers are produced in May. Plant in full sun to partial shade in moist or dry soils. Wooly speedwell *(V. incana)* has attractive silvery gray foliage with deep blue 12-inch flower spikes in summer while creeping speedwell *(V. repens)* has fine, dark, green, narrow foliage (moss-like) with bright, clear blue flowers in June. These speedwells are adapted to the southeastern part of the central plains and are not reliably hardy in the hotter, drier sections of the central and southern Great Plains.

Wild strawberry *(Fragaria vesea 'Americana')* spreads rapidly to form a dense mat 6 to 9 inches high. Plant tolerates sun or shade in a moist well-drained soil. Plant may require winter protection in exposed sites. Gives a woodsy effect to a landscape.

Hosta or plantain lily *(Hosta* species) is a large diverse group of long-lived herbaceous perennials. They thrive in semi-shade and are comparatively free of disease and insects. Hostas are grown primarily for their rich luxuriant foliage. Many newer varieties have varying degrees of foliage and have larger more fragrant flowers. One cannot rely on the specific names in this genera and many like types go by different specific names. Plant is hardy throughout the Great Plains.

Himalayan fleeceflower or Border Jewel *(Polygonum affine)* produces a wide mat 4-6 inches high. Plant is adapted to a wide range of soil types and tolerates full sun or shade. Flowers are rosy in hue, on dense, three-inch spikes in May. This species is more refined and less invasive than other members of this genus.

Fleeceflower *(P. reynoutria)* is a fast and rank growing plant. Showy clusters of red buds opening to pale pink flowers are produced in later summer. Plant is invasive and should not be planted near flower borders. Both of the polygonum species are hardy throughout the Great Plains.

Daylily *(Hemerocallis* species) is a highly diverse group with varieties from 12 inches to 6 feet high. Daylilies are adapted to a wide range of soil and climatic zones as well as being free of serious disease and insect pests. Highly attractive and fragrant flowers occur from May through September or later. Plant is drought tolerant, but apply moisture before and during bloom improves flower quality, size, and number. Plant in full sun in a well-drained soil.

False salvia *(Lamium maculatum)* and yellow archangel *(L. galeobdolon)* grow 6 to 8 inches high. Both species are fast growing and form a low dense mat. False salvia has marbled foliage and rose-pink flowers occur in spring through early summer. Leaves turn pink or pinkish purple in fall. Yellow archangel has silvery marked foliage and does better in shade. Lamiums are excellent groundcovers and deserve more extensive use. Protect in the more severe areas of the central plains.

St. Johnswort *(Hypericum* species) spreads rapidly to form a mat 6-15 inches high depending on species. *Hypericum calycinum,* a semi-evergreen species, grows 12-15 inches high. Bright, yellow, 3-inch flowers in mid to late summer.

Creeping St. Johnswort *(H. repens)* reaches 6" but dies to the ground in winter. Yellow flowers occur in July. This species more hardy than *H. calycinum* and is adapted to the entire geographical range discussed. Plant in full sun. These groundcover tolerate dry soils although occasional watering is recommended.

Woody Deciduous Groundcovers

Dwarf Cutlead Sephanandra *(Stephanandra incisa* 'Crispa nana') is grown for its graceful, deeply cut foliage. The June flowers are white and inconspicuous. It prefers a moist soil in a semi-shaded to shady location. In the Plains area it should be cut to the ground each spring, whereupon it will grow to a height of 2' and spread to form a dense mat.

Rose Acacia *(Robinia hispida* 'Macrophylla') is a spreading shrub of 3' or so in height, well-adapted to dry soil and bank plantings. This variety is larger than the species in all its parts. It produces showy, fragrant, dark rose-colored flowers similar to clusters of peat blossoms in June. Because of its rapidly spreading habit it should be planted either where it can be easily contained, or where it will be allowed to naturalize.

Yellowroot *(Xanthorhiza simplicissima)* withstands soil conditions ranging from heavy clay to dry, sandy banks. It tolerates full sun to part shade. It is planted for its handsome foliage, which turns shades of orange in the fall. The brownish purple flower cluster appearing in the spring are not significant. Ultimate height is 2-3'.

Hancock Coralberry *(Symporicarpos x. chenaulti* 'Hancock') is a good cultivar of the Coralberry, *S. orbiculatus.* It reaches a height of 2-2½' and suckers readily. Pruning in the spring produces an abundance of flowers and fruit. The fruit, which is its primary attribute, is clustered along the stem,

Continues on page 66

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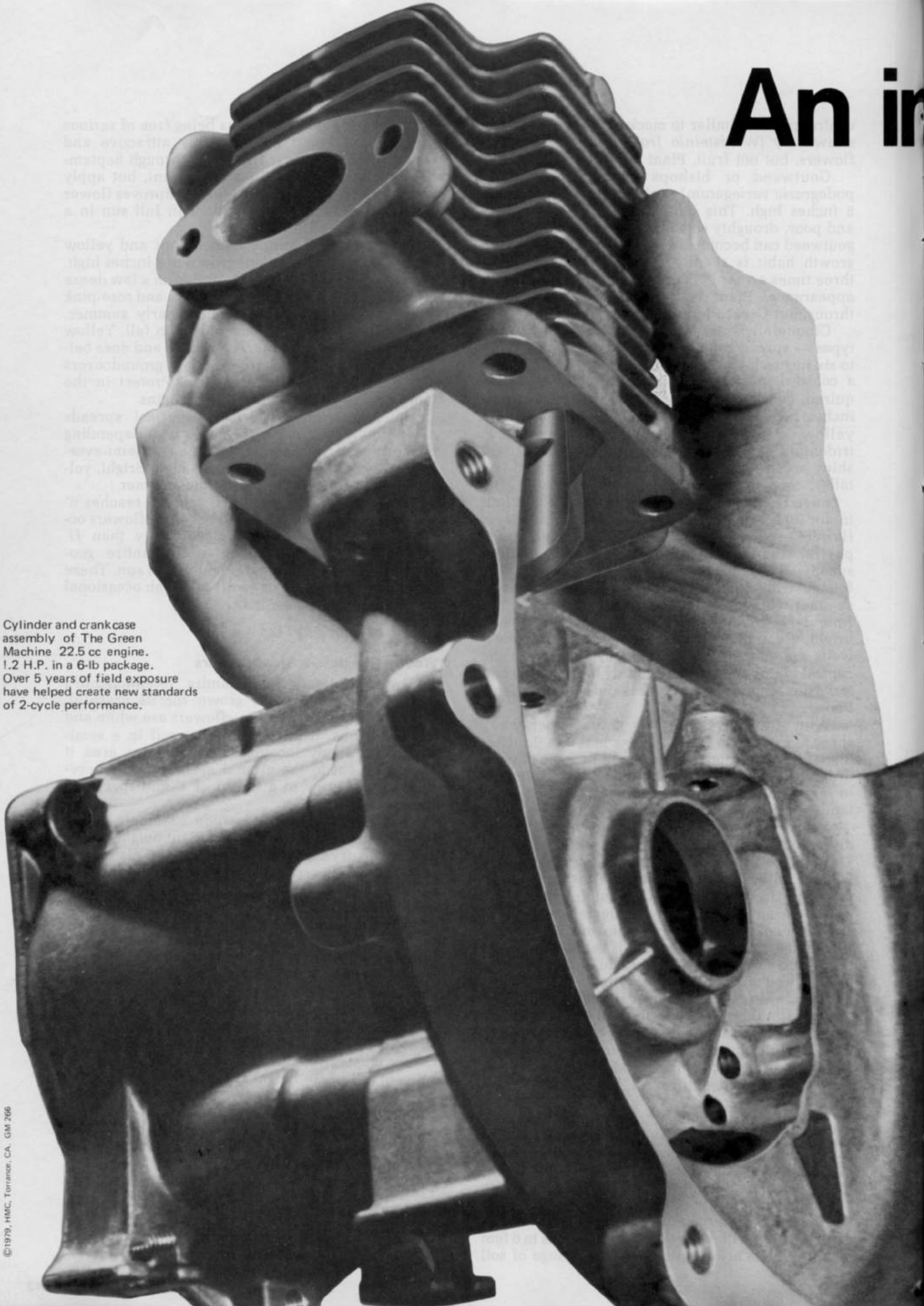

Cylinder and crankcase assembly of The Green Machine 22.5 cc engine. 1.2 H.P. in a 6-lb package. Over 5 years of field exposure have helped create new standards of 2-cycle performance.

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For instance, The Green Machine

model 3000 engines have been dynomometer tested—at full throttle and full load—for 200 hours. That's equal to 600 hours of field operation. Actual field operation of 1000 to 1500 hours is common-place.

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You'll see a precision die-cast cylinder with polished chrome-plated bore—plus such refinements as piston-port fuel timing and almost five square inches of scavenge porting. Running inside that chrome-protected cylinder, you'll see a precision die-cast aluminum piston, micro-honed and fitted with double, positively-located rings.

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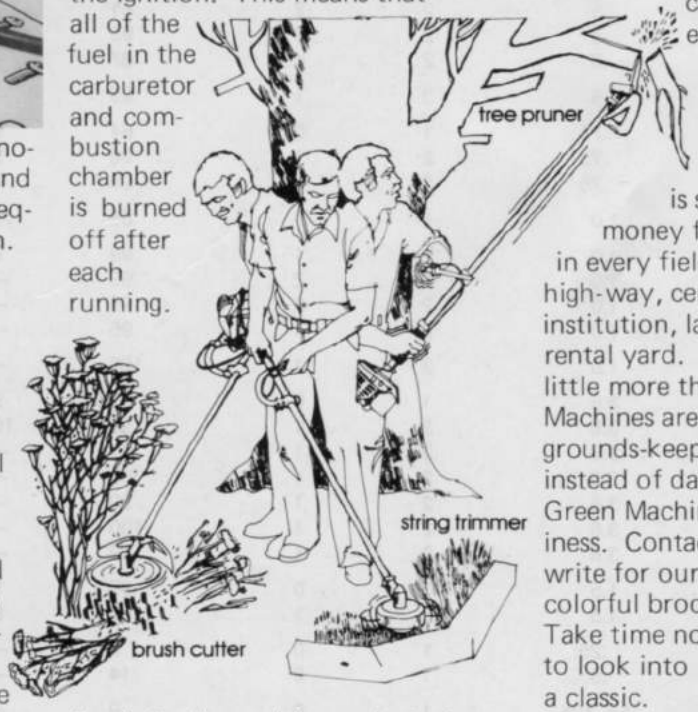
Long engine life is a recognized Green Machine virtue. So is easy starting. Thanks to a proven, reliable fuel pump and carburetor design. Plus an important Green Machine exclusive: Positive Fuel Shut-off. Engine "kill" is accomplished by stopping the fuel supply to the engine, rather than by cutting the ignition. This means that all of the fuel in the carburetor and combustion chamber is burned off after each running.



Fresh fuel is used for each start. Conventional "ignition kill" allows the fuel and oil mixture to remain in the chamber and carburetor where it can become stale and even, with time, create a residue that prevents starting.

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POSTEMERGENTS AVAILABLE FOR CONTROL OF NUTSEDGE IN TURF

by John A. Jagschitz, associate professor of plant and soil science, Rhode Island Agricultural Experiment Station.

Yellow nutsedge, a hard to kill weed in turf, is an increasing problem for turf managers primarily because of infestation from agricultural areas.

It is estimated that 10 to 15 percent of the crop acreage in the northeast is infested with this weed. Conversion of crop lands to sod farms and the use of this soil for topsoil and topdressing has accelerated the spread of nutsedge.

Yellow nutsedge (*Cyperus esculentus* L.) is a perennial weed which reproduces by seed, rhizome, and tuber (nutlet). Tubers start to grow in the spring and each may produce several rhizomes. In Rhode Island, these rhizomes terminate as emerging plants by late May or June and produce more rhizomes.

These plants are easily identified by their single, triangular stem with slender, yellow-green blades which grow faster and taller than mowed turfgrass.

The rhizomes terminate, in August and September, and form a tuber. These tubers are ready to

Continues on page 51

TABLE 1. Effect of herbicides, rates and treatment number, time interval and dates on nutsedge control and turfgrass injury when applied to developing Kentucky bluegrass sod in 1978.

		Treatment		Percent Nutsedge Control[a]		Maximum Turfgrass Injury[b]	
				(treatment started)		(treatment started)	
Herbicide	Rate lb ai/A	Number	Interval in weeks	June 30	July 21	June 30	July 21
Bentazon	.5	1	0	55	83	0.2	0.0
Bentazon	.5	2	1	99	97	0.2	0.2
Bentazon	.5	2	2	81	—	0.1	—
Bentazon	.5	2	3	95	—	0.1	—
Bentazon	.5	2	4	87	—	0.3	—
Bentazon	.5	3	1	99	—	0.0	—
Bentazon	.75	1	0	64	95	0.1	0.0
Bentazon	.75	2	1	98	99	0.3	0.0
Bentazon	.75	3	1	99	—	0.0	—
Bentazon	1.0	1	0	85	96	0.0	0.4
Bentazon	1.0	2	1	99	99	0.1	0.2
Bentazon	1.0	2	2	99	—	0.2	—
Bentazon	1.0	2	3	99	—	0.3	—
Bentazon	1.0	2	4	96	—	0.0	—
Bentazon	1.0	3	1	100	—	1.9	—
DSMA	3.6	1	0	62	99	0.5	3.3
DSMA	3.6	2	1	99	100	2.1	3.5
DSMA (201)	3.6	2	1	100	—	1.9	—
DSMA (301)	3.6	2	1	99	—	2.3	—
DSMA (401)	3.6	2	1	99	—	2.6	—
DSMA (501)	3.6	2	1	100	—	2.2	—
DSMA (601)	3.6	2	1	99	—	1.7	—
MSMA	1.5	1	0	60	94	0.4	1.9
MSMA	1.5	2	1	100	99	2.5	3.1
Bromoxynil	.25	1	0	0	—	0.0	—
Bromoxynil	.5	1	0	14	—	0.0	—
Bromoxynil + Dicamba	.5+.125	1	0	9	—	0.2	—
Bromoxynil + Bentazon	.5+1.0	1	0	90	—	0.2	—
DSMA	1.8	2	1	—	99	—	1.1
DSMA + Bentazon	1.8+.5	2	1	—	99	—	0.6
DSMA + Bentazon	3.6+1.0	2	1	—	100	—	3.0

[a]based on plant counts June 28 and August 28. Untreated plots averaged 11.5 nutsedge plants per sq. ft.
[b]scale 0 to 10 (10 = brown) maximum through August.

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Nutsedge *from page 46*

sprout the following season and account for much of the increase in the nutsedge problem.

Since yellow nutsedge is hard to kill and its presence is increasing in turfgrass areas, there is a need to find herbicides that will provide selective control.

Sixteen tests were conducted from 1971 through 1978 on Kentucky bluegrass being grown for sod. The turf was maintained at a height of about 1½ inches and varied in age from 2 to 18 months.

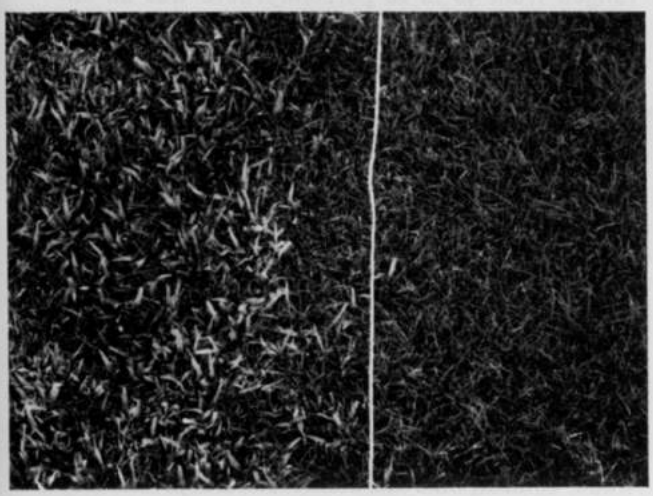
The herbicides studied were bentazon (Basagran, BASF Wyandotte) and various methanearsonates (MSMA, DSMA, MAMA, AMA). They were applied to replicated plots and were applied as sprays using 50 to 172 gallons of water per acre. Postemergence treatments were applied from May to August. Nutsedge emergence usually started in late May or early June.

Conversion of crop lands to sod farms and the use of this soil for topsoil and topdressing has acclerated the spread of nutsedge.

Visual estimates of grass stands or injury were recorded during the tests. Nutsedge plant counts (up to 53 per square foot) or estimates of percent cover (up to 55 percent) were made in August or September. Control was determined by comparing treated to untreated plots. Four test areas were observed the year following treatment to determine the change in the nutsedge population under sod conditions.

Results of Studies

Our studies have shown that certain treatments of bentazon and methanearsonates provide ex-



Yellow nutsedge grows faster and taller than mowed turfgrass. The yellow color of the blades sets the weed off from surrounding turfgrass.

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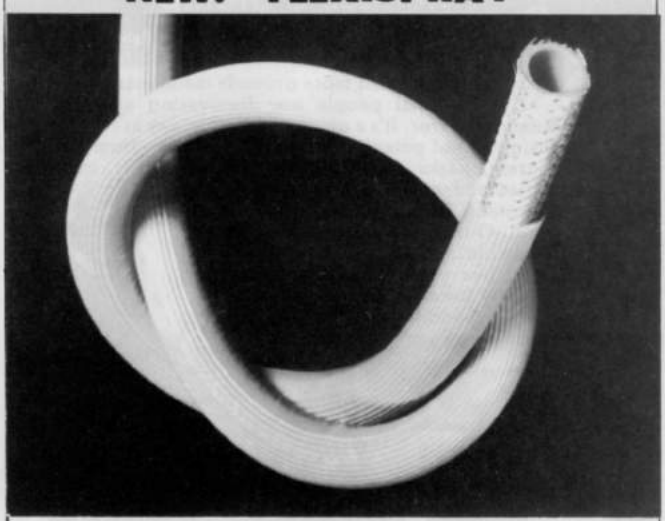

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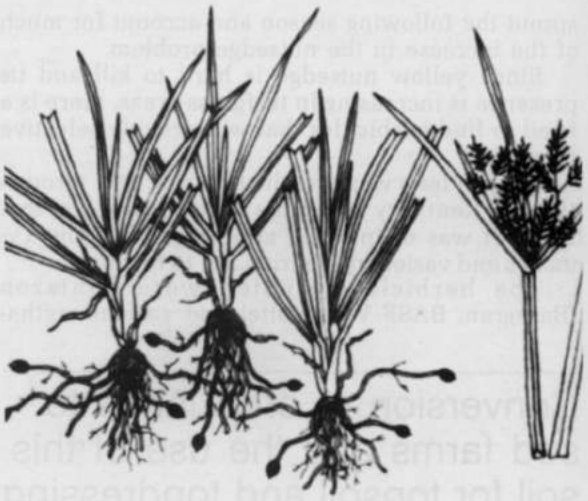

Nutsedge plant with rhizomes formed and nutlets starting.

cellent postemergence control of nutsedge without injuring Kentucky bluegrass.

Two applications of a herbicide at low rates and at 10-day intervals were usually more effective than a single application at higher rates. In these studies, we found that as the season progressed from June through July less herbicide and/or fewer applications were needed for control. And with methanearsonates, nutsedge was easier to control when growing in competition with grass than in open soil areas.

Kentucky bluegrass has shown greater tolerance, especially at high rates, to bentazon than to methanearsonates. Comparative results were obtained from the liquid and wettable powder formulations of bentazon, and the 50 to 172 gallon per acre spray applications of bentazon or methanearsonates.

We also discovered that there was a natural decrease in the nutsedge population in untreated sod areas the following season. The reduction ranged from 45 to 98 percent. There was an additional reduction, 89 to 100 percent, in areas treated the previous season with bentazon and methanearsonates. However, even with a reduction of 89 percent, there were still about three plants per square foot.

Comments

At present the methanearsonates such as AMA, DSMA, MAMA and MSMA are available for the control of nutsedge in turfgrass. They can be used at the same rates and with the same techniques as suggested for postemergence crabgrass control.

Bentazon is a product of the BASF Wyandotte Corp. call "Basagran". It is used as a herbicide in soybeans and is available for use on turfgrass. Because of its effectiveness the tolerance of Kentucky bluegrass and its value in seedling broadleaf weed control, this herbicide should prove very useful. Our data suggest good results from two applications at a rate of one half to one pound per acre spaced 10 days apart in July. **WTT**

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LAKE CITY COMMUNITY COLLEGE: TRAINING TO MEET INDUSTRY NEEDS

by John R. Piersol, Instructor, Landscape Design and Sales, Lake City Community College, Lake City, Florida

The first in a series of articles on educational programs established for the various horticultural professions. Two-year and four-year programs will be included. Instructors of such programs are invited to write Weeds Trees & Turf about their program. The hope is to compare different programs to judge curricula, the significance of two-versus four-year programs, and the importance of on the job training.

The horticulture industry has always needed trained personnel. This is more important today as sophisticated technologies and new government rules and regulations increase the complexity of horticultural jobs. For ten years, Lake City Community College has been successfully training students to meet the personnel needs of the green industry.

The Lake City Community College campus is carved out of the pine forests of North Florida. The college, under the leadership of Dr. Herbert E. Phillips, has an excellent scholastic reputation throughout the state. As with most community colleges, most of the 3000 students come from counties surrounding the college. However, students from throughout the country are attracted to Lake City to attend three unique programs at the college: Golf Course Operations, Golf Course Equipment Mechanics, and Landscape Design and Sales.

Golf Course Operations — The Golf Course Operations Program, as the name implies, is not a general turf program, but a curriculum that is designed to train students for golf course management positions. This nationally recognized program has many successful graduates who are now hiring recent graduates as their assistants. The specific emphasis on golf course operations and the tremendous industry support has made the program one of the best in the country. Three full years of study are needed to complete the program which includes one year of mechanics training, general background courses in plant science and pest control, and specific courses in golf course management.

Two summers of required on-the-job training (OJT) are an important part of the program. The summer training sites are located within a 500-mile radius of Lake City. The staff has developed a rapport with many golf course superintendents throughout the Southeast, so students are easily placed on many outstanding golf course facilities.

The OJT program at Lake City differs in important ways from similar programs at other schools. A golf course superintendent's attitude toward education is considered before his golf course is selected as an OJT site. This insures a positive training atmosphere. The students submit requests specifying golf course facilities and geographic areas they desire for summer training. Then the staff matches the requests with a golf course environment known to provide good training. Students are discouraged from returning to golf courses at which they were previously employed, at least for the first OJT. This rule forces students to learn new methods of golf course maintenance and personnel management.

During the summer, the instructors travel throughout the Southeast evaluating student progress at each training location. This gives the staff a chance to talk with the student and the employer to evaluate the learning environment. Each site is visited twice, each time by a different instructor. This summer travel has the added benefit of exposing instructors to new materials and methods used in the golf course industry. Students earn while they learn since they are paid by the employer and receive 12 college credits for their summer training. Their summer grade is determined by a required comprehensive report, by an employer evaluation, and the two on-site instructor evaluations.

Although the school is located in the South, many students come from northern states. In fact, some graduates return north to accept jobs. Both cool season and warm season grasses are taught, so a northern transition is not difficult. Also, many students go on OJT in the northern parts of the Southeast where they get practical experience on both bermudagrass and bentgrass.

Golf Course Equipment Mechanics — The Golf Course Equipment Mechanics program requires just one year of training with excellent job opportunities. Students learn diesel mechanics, hydraulics, painting, welding, sharpening and grinding, gas engine repair, as well as maintenance procedures on various types of golf course equipment.

An important aspect of this program is the emphasis put on shop organization and inventory control. These concepts are essential to the efficient operation of any maintenance facility. Students learn how to keep equipment maintenance records, how to properly order replacement parts, and how to establish an inventory of frequently used parts.

Hands-on experience is an integral part of this program. The curriculum includes both lecture and laboratory periods. During the labs, students work on actual golf course equipment supplied by the school, by nearby golf courses, and by turf equipment distributors. Summer classes include week long training sessions at various equipment distributors where students get an opportunity to work with experienced mechanics.

The tremendous industry demand for mechanics far exceeds the number of mechanic students. This situation provides a lucrative job

Continues on page 59

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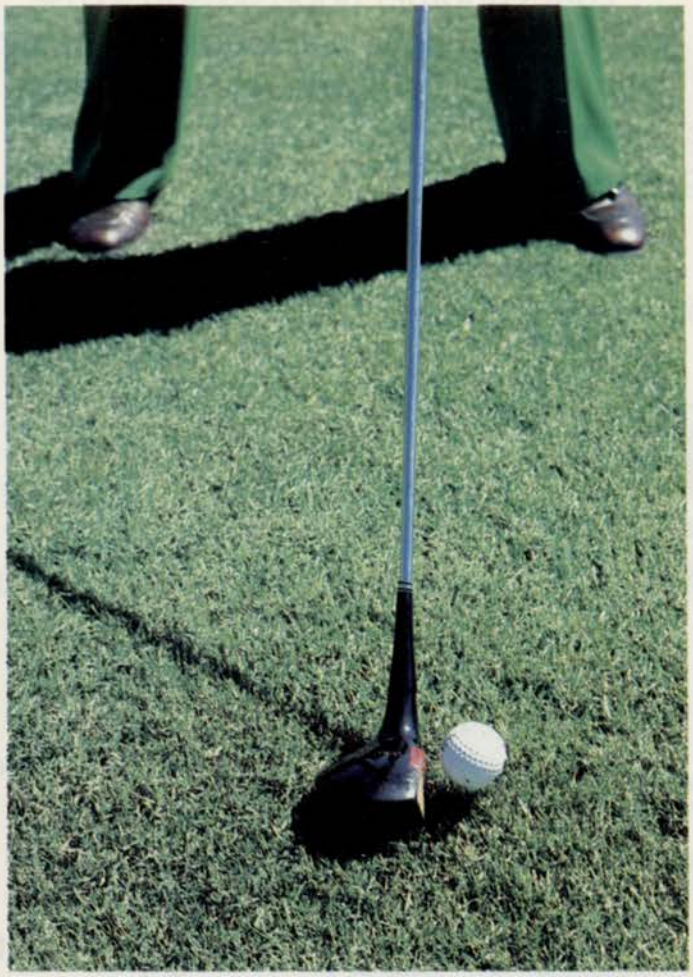

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Training *from page 54*

market for graduates of this program. With the increased sophistication of golf course equipment, and the resultant increase in prices, the need for trained mechanics will continue to grow. Last summer, each mechanic graduate had several job offers with starting salaries ranging from $4.00 to $6.00 an hour. Any student interested in mechanics should take a good look at the Golf Course Equipment Mechanics Program which provides an excellent return on a student's educational investment.

Landscape Design and Sales — Landscape Design and Sales is a two year program. What used to be a general horticulture program was changed two years ago to emphasize more design and sales. The curriculum includes general plant science courses, pest control, specific courses in landscape installation and maintenance, landscape design, interiorscaping, and business courses. Changes were made with industry input so that the curriculum would train the types of personnel the landscape industry needs.

Two summers of on-the-job training are an integral part of the Landscape Design and Sales program. Ideally, students get installation and maintenance experience on their first OJT and design experience on the second OJT. This is a logical split, but summer training is customized to meet the specific needs of each student.

Other unique aspects of the Landscape Program include required fall and spring tours during the senior year. Outstanding facilities in South Florida are visited during the fall tour, and Central and North Florida facilities are visited in the spring. These tours provide students and instructors with an opportunity to ask questions of successful Florida horticulturists and to observe various techniques of landscape installation, maintenance, and design.

Many green industry professionals are brought on campus to take part in a senior seminar course and to assist in Advanced Landscape Design. The idea is to expose students to a variety of landscape concepts as presented by various practicing horticulturists.

Existing department facilities that strengthen the Landscape Design and Sales Program include modern greenhouse facilities, a spacious drafting laboratory, and a half acre arboretum. There are presently plans to add an additional acre to the arboretum which confirms the staff's desire to constantly improve existing facilities.

Anyone interested in Golf Course Operations, Landscape Design and Sales, or Golf Course Equipment Mechanics should contact:

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VEGETATION MANAGEMENT

By **Roger Funk,** Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: *How does IBDU fine differ from powdered ureaform? I would like to know which one to use in my lawn spray service.*

A: Isobutylidene diurea (IBDU) is a relatively insoluble source that releases urea through hydrolysis (water dissolution). The urea is further mineralized by bacterial action to ammonium (NH_4^+) and nitrate (NO_3^-) ions, the two forms of nitrogen readily absorbed by plant roots.

The release rate of IBDU is dependent primarily upon two factors — the amount of available water and the particle size. Standard or coarse IBDU has a particle size of 0.7 to 2.5 millimeters in diameter and has excellent release characteristics when applied to turf as a granule. Unfortunately, when coarse IBDU is ground to a particulate size fine enough to pass through a traditional spray system (40 mesh or smaller), the solubility and availability are increased by as much as 33%. In addition, the constant agitation of the water bath and the hydraulic pressure and abrasion from the pumping system further increases the rate of dissolution, reducing the slow-release properties of IBDU.

By comparison, the breakdown and release of available nitrogen from ureaformaldehyde (UF) is not dependent upon particle size or the concentration of water. Ureaform is decomposed almost entirely by microorganisms in the soil which release urea and, ultimately, ammonium and nitrate ions. Therefore, UF can be ground to a fine powder and sprayed in a water carrier without significantly affecting its slow-release characteristic.

Q: *We have been using pre-emergent control for crabgrass, but it has no effect on other wide-blade nuisance grasses. What post-emergent control can you recommend to be applied without injury to desirable turfgrasses? What is the best time to apply?*

A: Pre-emergent herbicides control only the germinating seedling, thus would have no effect on existing perennial grasses. Perennial grass weeds can be killed with a non-selective herbicide such as Roundup, Dalapon or Amitrol-T; then, after the appropriate waiting period, the area can be reseeded.

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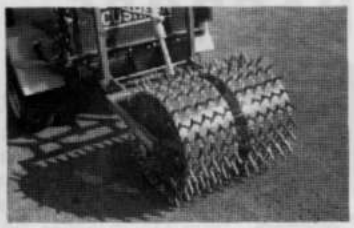

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the control of immature crabgrass and other annual grasses in turfgrass. You should make the first application when the crabgrass is less than one inch tall, and repeat the treatment in 7-10 days. A third application is often necessary to obtain satisfactory control. The herbicides are more effective when the crabgrass plants are actively growing. The organic arsenicals may cause the turf to discolor (yellow) following an application, but the injury is not serious unless the turfgrasses are under stress from heat and/or drought.

Q: *How do you keep bermudagrass out of a bluegrass lawn?*

A: Sanitary practices during turfgrass establishment and subsequent maintenance are very important to avoid introduction of Bermudagrass.

Kentucky bluegrass seed or sod should be purchased from a reputable source to ensure that it is free of undesirable weed species. The soil and topdressing should be fumigated or heat-treated prior to planting, and all tools and equipment should be thoroughly cleaned.

Cleaning is also important for mowers and other maintenance equipment which can carry stolons and rhizomes from other turf areas.

Certain cultural practices such as mowing and fertilization can influence the aggressiveness of bermudagrass in a Kentucky bluegrass turf. Mow at a height of 2½ inches, and apply fertilizer during periods which favor Kentucky bluegrass growth (50°-75°F).

Cultural practices alone, however, may not be sufficient to keep bermudagrass under control. Spot kill with Roundup and reseed or sod the area.

Q: *Has any spray been found effective against white fly? I have found Temik (granular) to be very effective but am looking for a spray.*

A: Certain products containing acephate, diazinon, dimethoate, endosulfan, lindane, malathion, Metasystox-R or naled are registered for use on white fly. For specific dosages and methods of application, refer to the product label. Some insecticides may be phytotoxic to certain plants; therefore, use only those chemicals registered for use on the specific plant species infested.

Q: *This past winter, field mice seriously damaged or completely girdled a lot of my Christmas trees. Is there anything I can do to protect my trees next winter?*

A: Cultural control of ground vegetation will limit cover for surface runways but will have little effect on the underground activities of pine or prairie mice. In any case, I suspect your area (Maine) has plenty of snow cover for protection.

Poison baits containing zinc phosphate are very effective when applied in fall before snow cover. Contact your local extension agent about preparing your own baits or buying a commercially available source.

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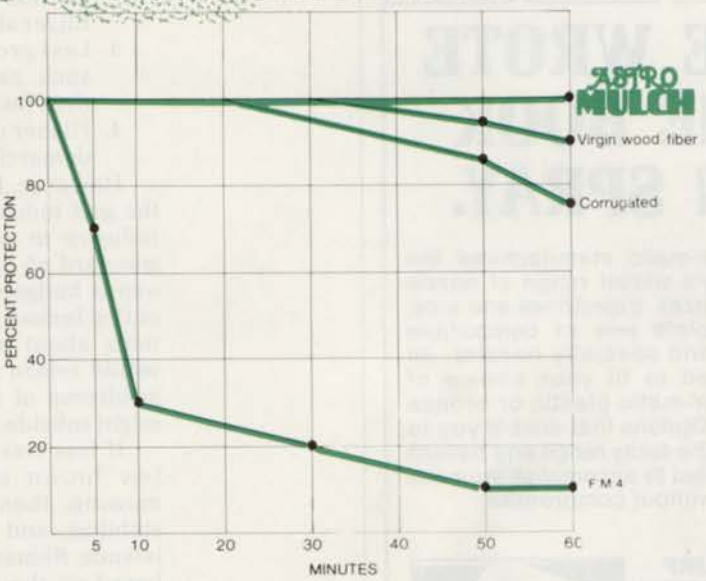

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PROSCAPE

By Michael Hurdzan, Ph.D., golf course architect and consultant

Q: *In your opinion how do you think the energy crisis will effect the future of the industry? G.F., Springfield, IL*

A: The total impact of an energy crisis, especially for fossil fuels after the Three Mile Island incident, can only be imagined but a possible scenario might be as follows:

1. Rationing of fuel with most dramatic reduction to less essential users (e.g. aesthetic maintenance, recreation, and recreation travel).
2. Reduction in fuel for production of products for less essential use reminiscent of the fertilizer shortage scare of a few years ago.
3. Less production of petroleum based products such as plastic pipe, polyethylene tubing, tires for recreation vehicles.
4. Higher costs of products based on supply and demand and increased shipping costs.

However, I can see some real benefits to at least the golf industry. The energy crisis may allow the industry to gracefully retrench from a spiraling standard of maintenance that has caused maintenance budgets to reach current high levels. If the entire industry was forced to lower their expectations about maintenance levels then sensibility would return and the "getting ahead of the Jones" syndrome of comparing golf course maintenance might subside.

If less was expected of a golf course, such as a few brown spots, less fertilization, water and mowing, then budgets would lower or at least stabilize, and golf would not be priced out of existence. Remember that the cost per round of golf is based on the price it takes to produce that round plus a profit. So if golf can be made less expensive then we have answered one objection voiced by non-golfers and that is "it costs too much" and golf may become more popular. Coupled to this will be reduced gasoline for travel, so more folks may be forced to stay home, which is bad for the pure golf resort, but it is good for hometown golf. Thus, either the local course will get more support and/or new ones will be built.

An energy crisis may spawn innovated methods of maintenance to cope with less energy and synthetic products or it may revive many abandoned, but sound, procedures used before our present mentality of wall to wall perfection. Loss of "wonder" products will force us to do basic thinking again about the total plant, soil, biotic complex and this is definitely good.

Loss of luxury power consumption may force a return to walking golf (as opposed to riding golf) so golf will be considered good exercise once again. Additionally we may see a renewed use of caddies which will not only provide employment for the young, but it will also expose them to golf and one can easily imagine the benefits of this exposure. The loss of income to the Golf Pro from golf carts may be offset by the increased lessons he will give and the cart companies can increase sales by

selling carts to the general public for neighborhood travel.

Q: *What process would you recommend for selecting and hiring a Design or Consulting firm? H.W., Dallas, TX*

A: You already have a headstart in your endeavor because you have begun to ask questions and you realize that selection is a process. Now all you need is to compose a proper set of questions and plan the process.

To increase the probability that you will retain the "best" firm, you should insure that all competent practitioners are aware that you are taking proposals. This can be accomplished by writing a complete and detailed description of your intended project, giving specific guidelines as to your expectations, time table, and any restrictive limitations. This description will allow the interested and qualified firms to be specific about their services and will help you to make your initial selection on paper if there are a large number of proposals. It may be necessary to employ a consultant to write your detailed description and help with the initial "paper" selections if you do not have an in-house expert. Although the best bet is a firm who does this sort of work, usually the university has someone qualified enough to get you started, but do not rely on them exclusively.

To get the greatest dissemination of your descriptive solication, contact all professional trade organizations related to the work (e.g. A.S.L.A., A.L.C.A., A.S.G.C.A., G.C.S.A.A., etc.).

Set a deadline for proposals and after reviewing them began an interview process with all firms that interest you. Since these can be time consuming, and you should plan on secondary and tertiary interviews, work backwards to determine the number of initial interviews you can handle based on your budget of time and money. Although how involved an interview should be, depends on the scope of your project, allow about two hours each for the first presentation. This should permit one hour for presentation and one hour for questions.

Since you are employing this Consultant/Designer for their technical abilities, dwell on the method and not just the finished product. Do not be afraid to ask questions about costs, sequence of events, frequency of inspection trips to be made by the principal Consultant, liabilities supporting documents, and guarantees. If several firms interest you ask for a complete list of past clients.

After the initial interview, eliminate those firms that do not seem to offer the services you need. Next make written inquiries about the firms you still feel are in contention and arrange to visit some of their work. I would talk not just with the owners but I would also talk to employees who tend to be more candid.

Once you have done these things, the final interviews should dwell on the specifics and I would ask for a final detailed proposal from the firm that I thought I wanted to employ. Additionally if a team approach is to be used, before final selection gather the tentative team together and insure that all areas of responsibility are understood and that the team feels it can function harmoniously. **WTT**

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and is white on the shady side and pink on the sunny side. It is tolerant of nearly all soil and sun conditions.

Fragrant Sumac *(Rhus aromatica)* bears small yellow flowers in May, followed by red berrylike fruit, but is grown primarily for its capacity to spread rapidly by underground stems and its yellow to red fall coloring. It is a good choice for bank planting, and tolerates dry, poor soils and full sun to partial shade. It will reach a height of three feet, but can be cut to within six inches of the ground in early spring to keep it in bounds. Its hairy, dust-catching foliage can be either a detriment or an asset, given a particular situation.

Kelsey Dogwood *(Cornus sericea* 'Kelseyi'*)* will spread by underground stems to form a mat no taller than 24". Its outstanding feature is the bright red new twigs, although it also displays white flower heads 2½-3" across in late May, white berries in the summer, and reddish summer foliage. It is tolerant of sun or partial shade, and performs best in moist to wet soils.

Bronx Forsythia *(Forsythia viridissima* 'Bronxensis'*)* will reach a height of 2' and a spread of 5'. It blooms in mid-April with greenish-yellow flowers an inch long. The fall color is a beautiful, bronze-purple and the foliage persists well into the winter. This is a good groundcover for bank planting. The Arnold Dwarf Forsythia is also a good groundcover, reaching a height of 3' and rooting readily wherever the arching branches touch the soil. It does not flower well, so should be planted for its habit only.

Black Chokeberry *(Aronia melanocarpa)* is a good choice when a shrubby groundcover of natural habit is called for. It tolerates many soils, but grows best in shady, wet areas. It displays white flowers in May, and black or purple berries and brilliant red fall coloring. The height is 1½-3'.

Cranberry Cotoneaster *(Cotoneaster apiculata)* is so named for its profuse red berries, borne in the fall following the small pink flowers in mid-April. The recurved branches and low height — 18-24" — require no pruning. It is a good plant for banks and is tolerant of almost any soil. Full sun to partial shade promotes the best growth. A similar species, *C. horizontalis*, reaches a height of 3'. All cotoneasters are susceptible to fire blight and red spiders and do not transplant well bare root.

Running Serviceberry, Juneberry *(Amelanchier stolonifera)* appears best in a naturalized setting where it can sucker freely. The delicate white flowers appear for a brief time before the leaves in early spring. The foliage turns many shades of orange and red in the fall.

Blue Mist Spirea *(Caryopteris x clandonensis* 'Blue Mist'*)* should be cut to the ground each spring to encourage new growth. The silvery foliage is

Continues on page 68

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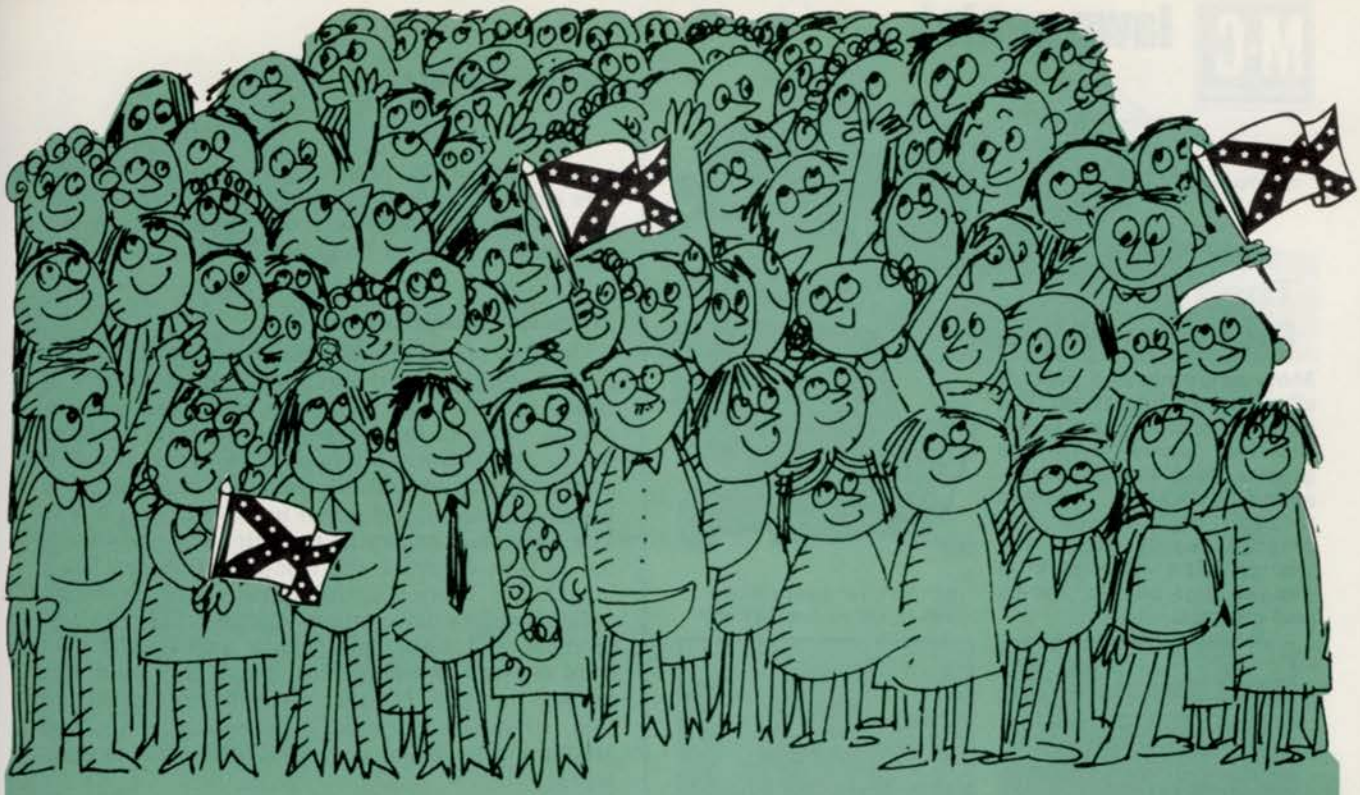

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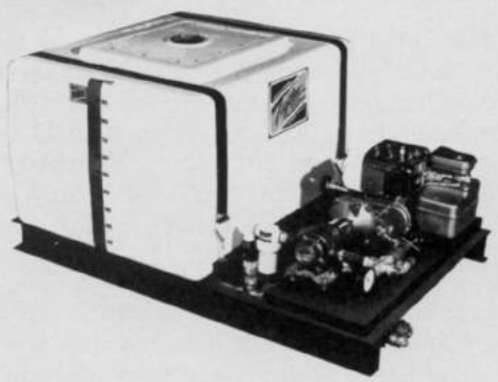

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reminiscent of that of the willow family in texture. The sprays of blue flowers appear in August when few shrubs are blooming. It does well in sunny, dry locations reaching a height of 18-24".

Evergreen Groundcovers

Juniper species *(Juniperus chinensis, J. horizontalis, J. Procumbens)* includes a great variety of sizes, shapes, and colors of evergreen groundcovers. None of the junipers are tolerant of shade but perform admirably in dry soils on sunny sites and under city conditions. Most are susceptible to bagworms, scale, red spider mites, and twig blight. The most well-known of the chinensis varieties is the Pfitzer, of which the compact form reaches a height of 3'. There is a gold-tipped variety available which displays pale, yellow new growth — the best of these is *J. chin.* 'pfitzeriana aurea'. The gold color is more pronounced in heavy clay soils. The Sargent Juniper, *J. chin,* 'sargentii', is one of the best spreaders forming a mat 8-10' wide and attaining a height of only 10-12". Its color is grey-green.

The most familar horizontalis variety is the Andorra Juniper, *J. horizontalis plumosa.* This feathery, flat-topped juniper turns an unusual silvery plum-pink color in the winter. The variety 'Youngstown' is more compact, reaching a height of only 10-15". The Bar Harbor Juniper has steel-blue summer foliage turning a silver-plum in the winter and reaches a height of 10-12". The lowest of the horizontal junipers is the Blue Rug, *J. horiz.* 'Wiltoni', which is only 5-10" tall and readily covers rocks and banks. The Hughes juniper, *J. horiz.* 'Hughes' is a 12" groundcover with silver-tipped, bluish green foliage. The Tamarix juniper, *J. sabina tamariscifolia,* has a mounded form and reaches 12" in height.. All of these junipers do well when purchased as container plants. The Dwarf Japanese Garden juniper, *J. procumbens nana,* is distinguished from the other groundcover junipers by its blue-green color and predominantly needled foliage.

Woody Broadleaf Evergreen Groundcovers

Wintercreeper *(Euonymus* species*)* is one of the most versatile broadleaf evergreens for the Great Plains region. The Purpleleaf Wintercreeper, *E. fortunei coloratus,* spreads rapidly by putting down roots from its prostrate stems, which then hold the soil. It is planted for its purple-bronze winter foliage color. *E. fortunei* 'Acutus' has dark green foliage which it retains through the winter. The Longwood strain of miniature evergreen bittersweet, *E. fortunei* 'Longwood' is similar to the Kew Wintercreeper in that it has the smallest leaves of any of the wintercreepers, which makes it suitable for small scale areas. Longwood is hardier than Kew in the Great Plains. The Bigleaf Wintercreeper or Evergreen Bittersweet, *E. fortunei radicans,* is valued for its uniformity of growth and rapid increase. All of the wintercreepers do well in sun or shade although some winter sun protection is helpful in preventing burning. They are not par-

Continues on page 70

TOUCHDOWN
Kentucky bluegrass

Leonard DeLalio and son, Leonard Jr., are the largest growers of sod on New York's Long Island. Headquarters are at Dix Hills with satellite operations at Eastport, Riverhead and Shoreham.

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ticular as to soil and moisture conditions. However, all are susceptible to scale, which must be controlled by a dormant oil spray if it is not to devestate the planting.

Dwarf Oregon Holly-Grape *(Mahonia repens)* has holly-like foliage which turns a bronze-red in autumn. It bears spikes of bright yellow flowers in early May followed by blue-black fruit similar to small grapes. In the plains area a north exposure is preferred to prevent burning of the foliage by the winter sun.

Baltic ivy *(Hedera helix)* climbs by aerial rootlets when planted against a wall, but may be easily maintained as a dense, dark-green groundcover. It should be planted in a north or east location to hold the foliage color through the winter as it burns in the winter sun and wind. Conditions of shade, moisture, and organic material in the soil will encourage the best growth. The variety 'Thorndale' withstands winter well.

Hall's Japanese honeysuckle *(Lonicera japonica halliana)* is a semi-evergreen vine which can become rampant if not pruned regularly, but because of its rapid growth habit is a good choice for large areas and banks. Its white flowers turn yellow with age. It is tolerant of nearly all soil conditions including dry soil, and grows well in sun or shade. It should not be planted where it can climb into trees or shrubs.

Evergreen

Carpet Bugle *(Ajuga reptans)* grows 4 to 12 inches high. While classified as evergreen or half evergreen in the mildest protected areas of the central plains, in most sites the foliage dies to the ground. The plant spreads rapidly by creeping stems. Cultivars bearing blue, purple, white and red flowers in spring are available as are cultivars with bronze, variegated, and variegated with splashes of burgundy. This latter cultivar, Burgundy Glow, requires a site protected from wind and sun or foliage colors will wash out or brown. One of the most popular cultivars is Bronze Beauty which performs well in sun or shade. Don't plant ajuga in poorly drained soil or root and crown rots will develop.

Periwinkle *(Vinca minor)* is one of the best carpet forming groundcovers where conditions are favorable. Most cultivars grow 3 to 6 inches in height although 'Bowles' reaches 8 inches and tend to clump more than other cultivars. The species forms blue flowers from April through May, while 'Alba' produces white ones. Periwinkle does best in a protected area in shade.

Evergreen candytuft *(Iberis sempervirens)* forms a dense mat 6 to 12 inches high. The plant is attractive throughout the year and particularly in spring (April and May) when it produces white, flat flower clusters. Plant in full sun or light shade. in a well-drained soil. Plant is not drought tolerant but requires regular watering. Cultivars such as 'Christmas Snow,' 'Snowflake,' and 'Little-Gem,' grow less rapidly than the species. Tends to do better in the eastern half of the central plains although it is sufficiently temperature hardy with mulch in the western half.

Continues on page 72

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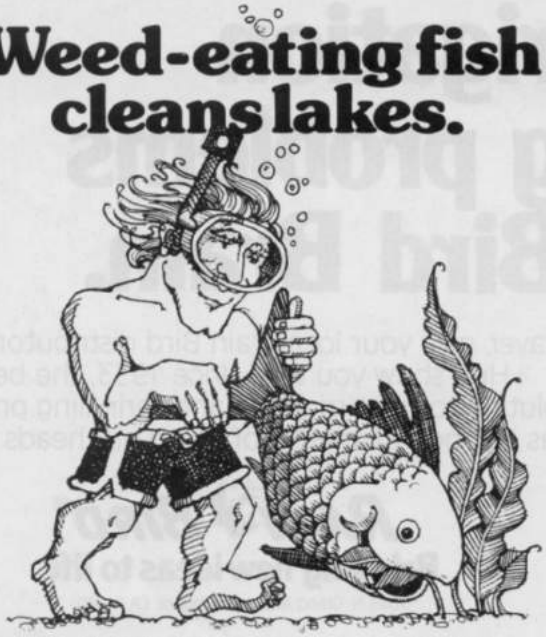

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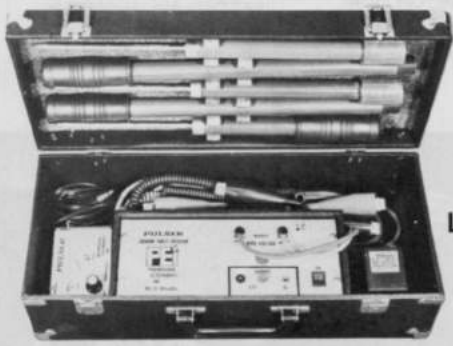

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Groundcovers *from page 70*

European wild ginger *(Asarum europaeum)* grows to a height of 6 inches. This plant is adapted to moist soils high in organic matter in deep shade. The leathery, kidney-shaped foliage is an attractive, glossy, deep green. Protect from drying winter and summer winds. A highly recommended groundcover where adapted. Hardy throughout the area if proper environmental conditions are provided.

Japanese spurge *(Pachysandra terminalis)* spreads slowly to form a mat 6-8 inches tall. Spurge does best in moist acidic soils in full shade under Norway Maples. Well-drained soils high in organic matter should be provided. Prune back plants before growth begins in spring. A variegated cultivar 'Silver Edge' is available. Additional winter protection is required for the variegated types. The plant is hardy where planted in an appropriate site, although winter mulch is required in western and northwest parts of the central plains.

Stonecrop *(Sedum* species*)* spread slowly to form a mat or a clump-form 3-15 inches high. Low growing (mat types) may winter burn in exposed places. Cold hardy throughout the central plains. It has abundant flowering and requires little care. Where low maintenance is desired, sedums are choice groundcover. *Sedum acre* — mat former with yellow flowers. *S. sexangulare* — less vigorous than *S. acre,* but otherwise similar. *S. spurium* 'Dragon's blood' grows 4 inches tall with dark red flowers in early summer.

Establishment and Maintenance

To establish a groundcover prepare the site as follows: first remove all sod. Then till to a depth of six to 10 inches. If possible improve soil structure and thus drainage by the addition of soil amendments, such as coarse sawdust, ground corn cobs, rotted manure, pine needles, shredded hardwood bark, shredded tree leaves, compost or other readily available and inexpensive amendment. One-third of the mix should be organic matter. To obtain this mix, apply a 2-3" layer of the amendment to the soil surface. Incorporate to a six-inch depth. Don't "pocket-modify" a soil, i.e., modify planting hole; either modify the entire groundcover area or don't modify.

Where economically feasible fumigate the soil to eliminate weed seed, soil insects, and disease organisms. Check with your local county extension office for the recommended soil fumigants for your area.

Take a soil test to determine pH and the present phosphorus and potassium levels. Based on these tests, appropriate recommendations will be made for your site and groundcover. The amount of nitrogen required will depend on the specific groundcover grown, soil type and site characteristics, but normally 4-5 pounds of 5-10-5 fertilizer per 100 square feet is recommended.

Spacing of plants depends on desired or available capital for purchasing plants and growth rate of specific groundcovers used. As expected, the closer the spacing the sooner the ground is totally covered. Once this occurs weed control is generally unnecessary. *Continues on page 74*

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Groundcovers *from page 72*

Weed Control

Controlling weeds in newly planted groundcovers accounts for the high maintenance during the first two to four years. Several approaches to weed control are available. These include hand cultivation, soil sterilization, mulches, and herbicides. Usually a combination of the above methods is used.

If used in sufficient quantities (3-5 inch layer), organic mulches will control or reduce weed infestations and thus reduce hand labor. Unfortunately this amount of mulch and the application of it can be costly. Further, additional amounts of organic matter must be added yearly to maintain an effective layer.

Preemergence herbicides (treflan and dacthal) will reduce weed problems. Read and follow label direction carefully; some groundcovers will not tolerate these herbicides and all of them will be injured by excessive amounts.

Research at the University of Delaware indicates root dipping in activated charcoal will allow use of increased amounts of herbicides and more phytotoxic ones to obtain more effective weed control.

Watering

Maintain adequate soil moisture during establishment. Moisture stress during these initial 2-4 years will slow establishment. After the mat is formed, water to the requirements of the specific groundcover. Regardless of the groundcover grown, allow the water to penetrate deeply, i.e., wet the entire root zone. If feasible, water early in the day to allow foliage to dry before nightfall. Avoid brief, light sprinkling.

Pruning

Initial pruning is done to encourage branching in those groundcovers with basal buds such as vinca (long-trailing, branch types) but not ajuga. Once established minimal pruning is required. Prune to remove dead or unhealthy tissue; maintain desired density and form; keep planting within bounds; and aid in rejuvenating a planting.

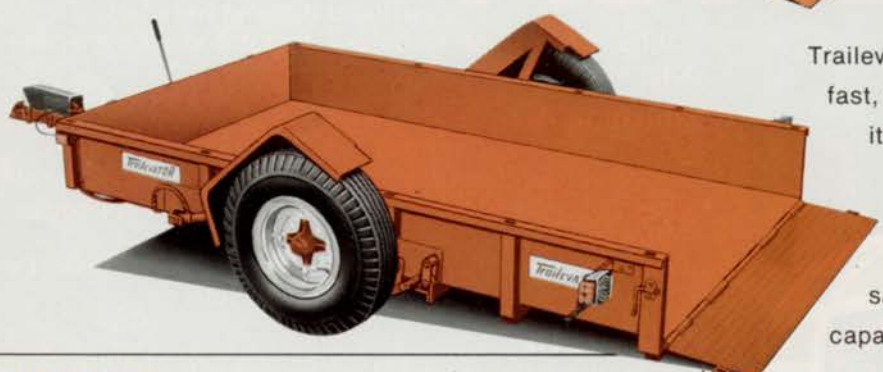
Winter Protection

Select groundcovers for your site carefully. Adapted species and cultivars are less likely to suffer winter injury. Soils properly amended and ones that drain well reduce the amount of root and crown rots that predispose groundcovers to winter injury. Use a coarse mulch after the ground freezes to lessen the likelihood of heaving and desiccation. Don't allow salts used to melt ice to contaminate the soil or severe injury to the plants and soil structure will occur. **WTT**

ONE MANhandling

TRAILEVATOR the hydraulic elevating trailer that lifts its own load in seconds...

Load... *Elevate...* *Go!*



Trailevator lowers to ground level for fast, 'roll aboard' loading, then lifts its own load to hauling position in seconds. Lowers and lifts without uncoupling from towing vehicle. Saves time, saves money. Four models, two capacities: 3,000 lbs. and 2,000 lbs. Bed sizes up to 5'-10" x 10'.

TILTSTER, the low bed trailer that tilts...

Drop-axle, tilt-type trailer handles loads up to 5,000 lbs. Simple one-man operation. Easy access, tailgate ramp for ground level or low platform loading. Single and tandem wheel models. Bed sizes to 5'-10" x 12'.

MagLine

P.O. Box 425, Pinconning, Michigan 48650
Tel: (517) 879-2411

 Circle **146** on free information card

New EXCEL HUSTLER 261

Mows a full 60" where most 50" mowers can't go!

A new concept deck design* turns the EXCEL HUSTLER 261 into a 4-way system: for mulching, or discharge to side, to rear, or into optional catcher. Adjustment is no trick at all. Operator can change from one mode to another in the field, without using tools.

The new mid-size 261 is the latest performer to wear the proud EXCEL HUSTLER name. Featuring the proven dual hydro drive, it introduces a whole new generation of innovative features:

- all-new in-line power train
- new quiet power engine
- shorter wheel base
- and the multi-option deck

For groundskeepers who must mow narrow passages, its wide 60" cut with only 3" wider running width may be the finest new feature of all!

Both mowing deck and engine are mounted on a single floating frame, maintaining constant relationship. Resulting straight line belt drive produces top power efficiency and long belt life. New deck design minimizes scalping.

Dependable Briggs & Stratton 16 hp 4 cycle, twin cylinder engine; service and parts are as close as 25,000 factory trained authorized dealers the world over.

Watch for a field demo or write for free literature and Distributor's name. Call toll-free (800) 835-3260; in Kansas or Canada, call (316) 327-4911 collect. EXCEL HUSTLER turf and groundskeeping equipment is built right by Excel Industries, Inc., Box 727, Hesston, Kansas 67062.

For GSA: GS-07S-03665 For HUD: OAH(CO)m 2635

* patents pending

EXCEL HUSTLER

Turf Equipment

There's a difference!

EXCEL INDUSTRIES, INC. / Box 727 / Hesston, Kansas 67062 / (316) 327-4911 / (800) 835-3260

Conwed® Hydro Mulch® 2000. It's in the bag.

Hydro Mulch® 2000 is a ready-mixed tackifier and mulch in one bag. That simplifies storage and helps eliminate loading errors. Application is fast and easy. Hydro Mulch 2000 fibers cut post job maintenance costs and provide protection against costly repairs and redo's. The special tackifier helps hold down the fiber mulch, seed and fertilizer while it protects against wind and water erosion. The fiber mulch holds water and stabilizes temperature variances for fast seed germination and strong plant starts. A temporary green dye permits monitoring of application and gives the job a finished look.

Write for informative brochure. Conwed Corporation, Fibers Division, 332 Minnesota St., P.O. Box 43237, St. Paul, Minnesota 55164. Phone: (612) 221-1190.

Conwed®

innovative products for better environments

Circle **135** on free information card

SUPER D WEEDONE® APPLIED BY METER-MISER

Only way to total lawn weed control!

Homeowners-Contractors

Need a METER-MISER?

By the hour • By the day • Low rates

UNION CARBIDE

Agricultural Products Company, Inc., Ambler, PA 19002

Circle **167** on free information card

WT&T PRODUCTS

Brinly-Hardy Company has introduced a new box scraper for tractors with category, "o" or "1" hitch. The scraper may be operated in forward or reverse gear, with the cutting action controlled by the upper link on the 3-point hitch. Both front and rear cutting blades are high carbon steel and may be reversed for wear.

The scraper is available in three or four foot widths and may be purchased with or without the Binly tubular hitch mast. The mast is recommended for tractors up to 35 horsepower and equipped with category "O", "1" or special Japanese category "1" 3-point hitch. An optional scarifier kit is available.

Circle 701 on free information card

The new OLYMPIC 254 chain saw incorporates design and safety features demanded by professional woodcutters. Electronic ignition and an advanced anti-vibration system head the list of features. Electronic ignition eliminates service of points and condenser and assures longer spark plug life with hotter spark for uniform peak performance.

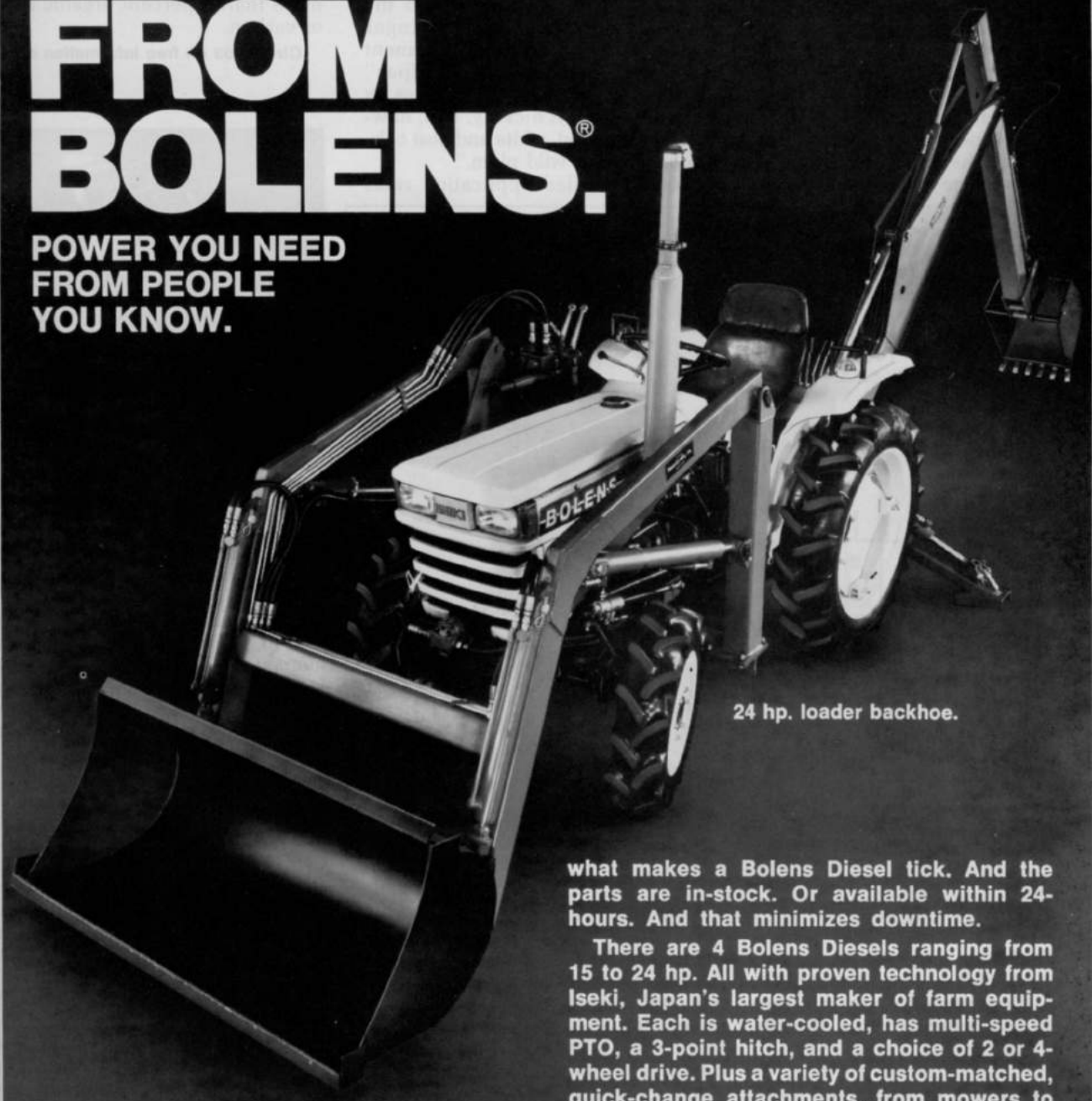
The 254's anti-vibration system effectively isolates engine and chain vibration from the operator by rubber mounts between handles and power head. The effect is a smoother operating unit which lessens operator fatigue and reduces possibility of production cutter's affliction called "white fingers."

The 3.3 cu. in. unit also features a new, quiet muffler which blows exhaust away from operator, protective front and rear hand guards, safety trigger interlock to prevent accidental throttling, and a positive choke lever. Bar and chain lengths up to 24" are available.

Circle 702 on free information card

DIESELS FROM BOLENS.®

POWER YOU NEED FROM PEOPLE YOU KNOW.



24 hp. loader backhoe.

Match the work that you need done with the right Bolens Diesel, and you'll have a tractor that works when and where you need it.

To get the right Bolens Diesel, see your Bolens dealer. He'll suggest one that has the maneuverability and versatility that you need to get the job done. Day after day. Year after year. And if after all that dependable service something should go wrong, just give him a call. He's been factory-trained so he knows what makes a Bolens Diesel tick. And the parts are in-stock. Or available within 24-hours. And that minimizes downtime.

There are 4 Bolens Diesels ranging from 15 to 24 hp. All with proven technology from Iseki, Japan's largest maker of farm equipment. Each is water-cooled, has multi-speed PTO, a 3-point hitch, and a choice of 2 or 4-wheel drive. Plus a variety of custom-matched, quick-change attachments, from mowers to snowthrowers and backhoes to front-end loaders. Or anything in-between.

The Bolens Diesel and the Bolens dealer. Equally capable. Equally dependable. See them today. For the name of the Bolens Diesel dealer nearest you, call 800-447-4700 toll-free anytime (in Illinois, call 800-322-4400). Or write the FMC Corporation, Port Washington, Wisconsin 53074.

FMC

© 1979 FMC Corporation

"Velpar" "Gridball", a pelletized brush herbicide, has been approved by the EPA for control of undesirable woody plants in noncropland areas. It has been labeled for use in Arkansas, Louisiana, the eastern half of Oklahoma and Texas, and all states east of the Mississippi, according to the Du Pont Company.

The pellets are distributed in a random grid pattern. As rainfall dissolves them, the herbicide is moved into the root zone and is absorbed by the woody plants during periods of active growth.

"Initial symptoms of herbicidal activity generally appear in three to four weeks after sufficient rainfall has carried the herbicide into the root zone," according to Roger Rohrbough, product development manager for Du Pont. "Velpar" "Gridball" controls such species as dogwood, cherry, hickory, elm, hawthorn, maple, red, white and post oak,, sweet gum and wild plum."

Recommended application rates range from 10 to 40 pounds per acre with higher rates being recommended for hard-to-kill species, for fine-textured soils such as clay and clay loam, and for soils containing more than 5 percent organic matter or carbon.

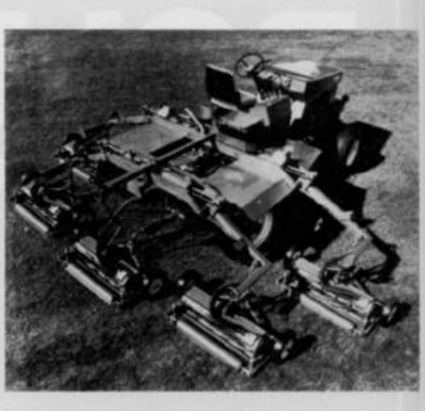
Circle 703 on free information card

Yes! You can dig it . . . and transport it . . . and transplant it — by yourself — in minutes with the Vermeer Tree Spade. It's the fastest, most efficient, most economical method of transplanting or packaging trees and shrubs in existence today. Out-lasts, out-performs and out-maneuvers a whole crew of laborers. And, the best part? It's a one-man operation. Saves you thousands of dollars annually because the Vermeer Tree Spade operates on a tankful of gas, not a handful of expensive paychecks. Five easy-to-operate machines. Available in trailer, tractor or truck-mounted models. Each equipped with hydraulically controlled steel "spades" that handle the entire job quickly and gently. So you **can** dig it . . . with trees up to 8" in diameter. Ask your Vermeer dealer for a demonstration today.

Vermeer ©THE DIGGIN' DUTCHMAN

6305 New Sharon Road • Pella, Iowa 50219 • (515) 628-3141 • Telex 478-309

Circle **163** on free information card



The Toro Company has introduced the HTM-175, a diesel-powered, seven-gang all-hydraulic reel mower. The ability of the HTM-175 to produce a superior quality of cut consistently under a wide range of conditions is due primarily to the unique design of the reel units, according to Dennis Brown, marketing manager. Each weighs 110 pounds less than Toro's wheel-driven gang mower units. They also feature a coupling system that keeps the units in balance and enables them to follow precisely the contour of the turf.

The prime mower of the HTM-175 is a Perkins 4-cylinder 236 c.i. diesel with high flotation tires to reduce compaction and tire marking. The tractor has power steering, four-speed transmission, full instrumentation and an adjustable foam-filled contour seat with backrest.

The HTM-175 will mow swaths from 31 inches to 14 feet, 7 inches with a height of cut from ⅜ of an inch to 2½ inches. It can mow up to nine acres per hour at recommended speeds up to 6 m.p.h.; for transport, the unit can travel up to 20 m.p.h.

Six hand controls at the driver's side simplify mowing operations. Reels 1, 2 and 3 operate together from a single control. Reels 4 through 7 operate individually. The reel units can be raised and lowered in any sequence and pulled up to 8 feet in width to clear tight places with no units ahead of the driver to obscure front view.

Quick height-of-cut adjustment streamlines mowing schedules by

Continues on page 82

Hydro-seed with Cellin Fiber Mulch

Economical, weed-free beauty and erosion control

CELLIN FIBER MULCH

A product of Cellin Manufacturing, one of the nation's largest producers of cellulose fiber products. It is available from New England to the Gulf states.

PROTECTS THE SOIL

Cellin fiber mulch creates absorbent "mini-umbrellas" to protect the ground against rain. This allows the rain water to seep into the soil slowly, preventing erosion.

NO WEEDS IN CELLIN

Cellin fiber mulch is a re-cycled product which contains no weed seeds. Spray in one operation with no possibility of introducing aggressive growing cereal to compete with your spec. seeds.

PROTECTS SEEDLINGS

Cellin fiber mulch provides a thermal barrier that minimizes variances in ground temperatures. This helps assure germination.

GREEN, BIO-DEGRADABLE

The water-soluble dye in Cellin mulch gives the hydroseeder a visible gauge for metering the ground being sprayed. The color gives an attractive, temporary green appearance to the ground. The mulch fibers gradually decompose as the grass firmly takes root.

CELLIN
MANUFACTURING INC.

Circle **130** on free information card

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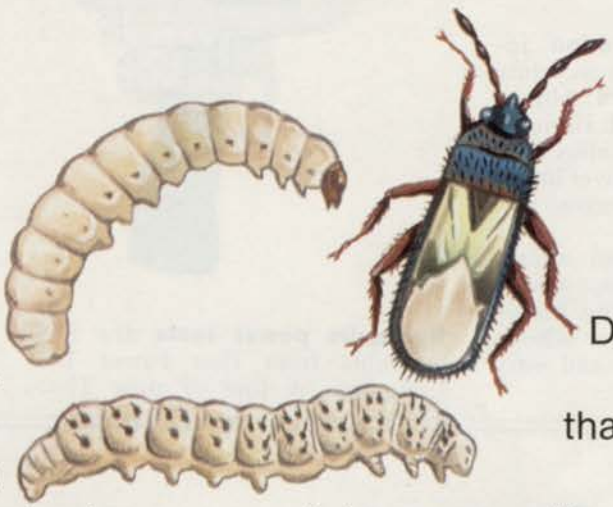
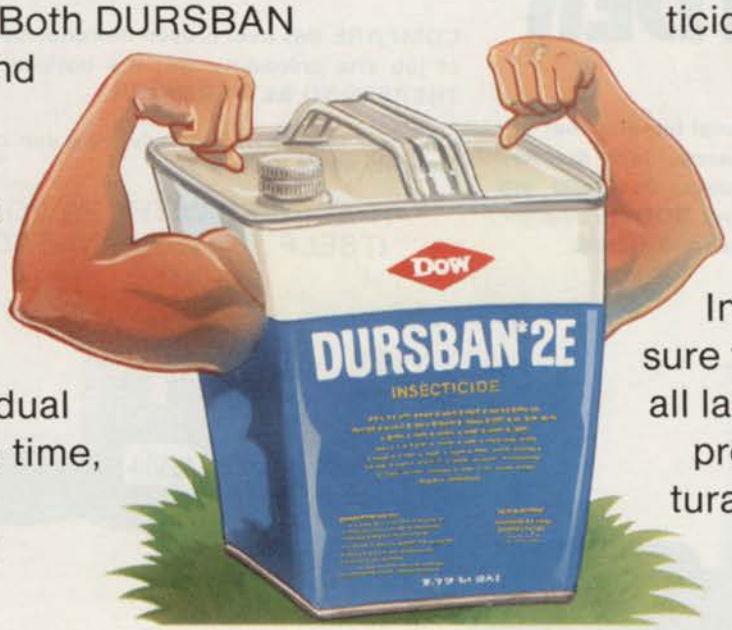
9610 GUNSTON COVE ROAD
LORTON, VIRGINIA 22019
(703)690-1195

7:00
LAWN PROTECTION
DOW
DURSBAN* 4E
INSECTICIDE
WARNING

HIRE THE INSECTICIDE THAT LIKES TO WORK OVERTIME.



DURSBAN* brand insecticides provide unsurpassed residual control of cutworms, chinch bugs, sod webworms, and a dozen other turf pests. Both DURSBAN 2E Insecticide and double-strength DURSBAN 4E Insecticide keep working a lot longer than other turf insecticides. This residual action saves you time, trips, and labor. It also saves you money. In fact, DURSBAN insecticides cost less than most other turf insecticides. Ask your supplier for the turf insecticide that works overtime for you. Get DURSBAN 2E Insecticide or double-strength DURSBAN 4E Insecticide. Just be sure to read and follow all label directions and precautions. Agricultural Products Department, Midland, Michigan 48640.



*Trademark of The Dow Chemical Company

DOW CHEMICAL U.S.A.

Circle **156** on free information card

allowing the operator to change all seven reels on site in just 7 to 8 minutes.

Reversible reel motors allow backlapping on the machine for reduced sharpening frequency and permit the operator to clear the reels without leaving the driver's seat.

For safety, an exclusive seat interlock switch stops all reels if the operator leaves the seat. Further, the reels will not rotate in transport. ROPS construction with seat belts is optional.

Circle 704 on free information card

The Sensation Corporation introduces a new 21-inch heavy-duty commercial, self-propelled mower. Features include a high-strength, rust-proof, mag-aluminum alloy deck and a special four horsepower Briggs & Stratton valve rotator engine that prolongs engine life.

A rachet-drive system allows power drive or pushing the mower back and forth for trimming. Finger tip control and 10-inch rear wheels provide power, traction and easy operation.

The mower will mow and bag wet or dry grass without clogging, according to Sensation, and has an optional three-bushel capacity catcher. Height adjusters allow nine settings, from one to three inches, without tools. An easy on, off chute deflector with hardware is included.

Circle 705 on free information card

Hydraulic power tools are now available from Thor Power Tool Company. A line of new Thor-Draulic tools, ranging from an 80-lb. Breaker down to a 6-lb. hydraulic Impact Wrench and including three sizes of hydraulic chain saws (16", 20", 24"), a 60-lb. Breaker, and a submersible hydraulic pump of 300 gpm de-watering capacity are offered. To operate the new Thor-Draulic tools, Thor also introduced a self-contained portable hydraulic power unit operating at 10 gpm/2000 psi and energized by a 16 hp gas engine.

Advantages of hydraulic power tools include quiet operation, high efficiency ratios (power-per-pound-of-weight), and consequent operating economies.

The new Thor-Draulic tools are the product of five years of research and development and field testing. The new Thor hydraulic tools and power units are illustrated and described in a free 8-page catalog.

Circle 706 on free information card

Briggs & Stratton Corporation has announced a new 5-horsepower single-cylinder, four-cycle engine especially designed for professional lawn care and other industrial and commercial applications.

The SPYDER®

COMPARE this user proven material handler with other methods of job site unloading and the bottom line will show you that THERE IS NO BETTER WAY!!

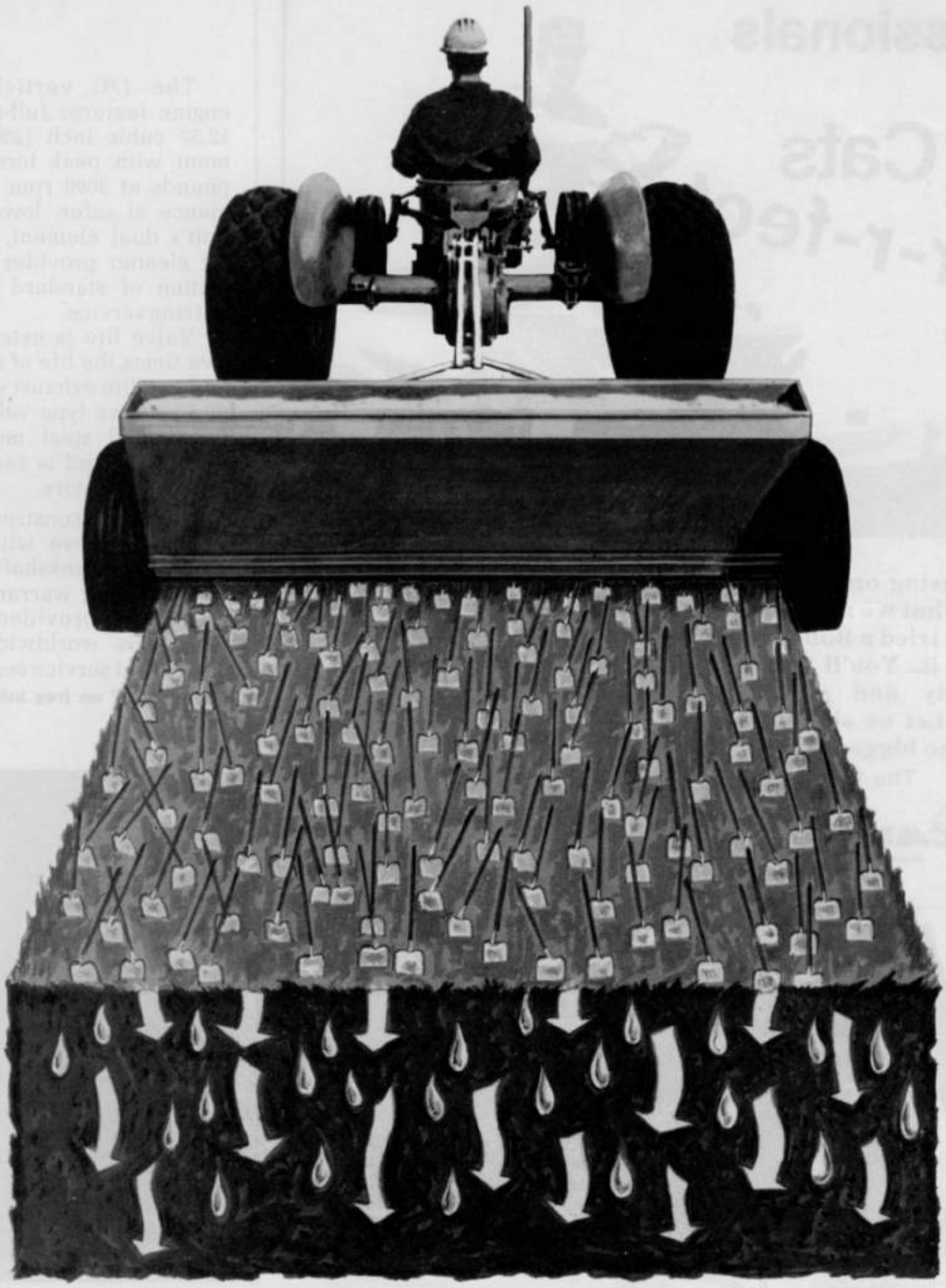
THE SPYDER — A material handler that offers unequaled performance, low maintenance and operating costs. Over 600 are currently being used by SOD producers across the U.S.A., Canada and England.

Ask your friends. If they say they don't like the Spyder, they've probably never tried one.

IT ARRIVES WITH THE LOAD, UNLOADS ITSELF . . . THEN UNLOADS THE LOAD!

For more information on the Spyder, call or write:
MIKE WHITT — SALES MANAGER
Foxcroft Development
5402 Edgewood Road
Crystal Lake, Illinois 60014
(815) 459-3351

Circle **165** on free information card



Easy way to loosen heavy clay soil! Works like millions of tiny hoes.™

Sof'n-Soil™ Gypsum works its way down to loosen heavy clay soil so it can breathe. Lets air and water penetrate, boosts efficiency of costly fertilizers. Sof'n-Soil, a natural mineral, stimulates vigorous root systems—promotes growth of grass, trees, shrubs, and flowers. Ecologically safe, Sof'n-Soil *is not lime.* It's neutral, non-caustic, non-burning—harmless to plants, pets, and people. And here's the bonus: Sof'n-Soil supplies essential calcium and sulfate sulfur in readily available form, stimulates decomposition of organic materials, too. Write to us at 101 S. Wacker Dr., Chicago, Ill. 60606. Dept. WTT-39.

CHEMICALS DIVISION
UNITED STATES GYPSUM
Primary Supplier of Secondary Plant Nutrients

Circle **154** on free information card

Professionals Use Bob Cats with Purr-r-fect Pride!

Available in 61" or 74" cut widths

If you are using one of our 10 Bob Cat mowers, you know what we mean by *'Purr-r-fect* Pride'. If you haven't tried a Bob Cat yet, maybe now is the time to do it. You'll find out what durability, dependability and *purr-r-fectly* mown grass really are. Let us show you why Bob Cats are becoming the biggest names in lawn care.

Free Brochures

The 10 models range from the 18" push to the 74" rider

Dealer Inquiries Invited

BOB-CAT Wisconsin Marine, Inc.

Lake Mills, WI 53551 (414) 648-2331

Circle **172** on free information card

FIBERGLASS TURF SPRAYERS Myers

TL10 and 40 Series

VTL10 Series

Myers fairway and general turf maintenance sprayers offer non-corrosive fiberglass construction throughout. Agitator assembly is stainless steel. Wide choice of optional running gear. PTO or engine drive. 100, 200 and 300 gallon tanks. 10 and 25 GPM. Write for our catalog.

Myers TurfLine

F.E. MYERS CO. DIVISION OF McNEIL CORPORATION

400 ORANGE STREET, ASHLAND, OH 44805

Circle **116** on free information card

The I/C verticle crankshaft engine features full-rated power of 12.57 cubic inch (206 cc) displacement with peak torque of 7.6 foot pounds at 3000 rpm for top performance at safer, lower speeds. The unit's dual element, industrial-type air cleaner provides twice the protection of standard cleaners, minimizing service.

Valve life is extended to nearly five times the life of standard valves with stellite exhaust valves and seats and positive type valve rotators. An aluminized steel muffler provides longer life and is readily adaptable to spark arrestors.

Optional construction includes cast iron sleeve with ball bearing supported crankshaft. Brigg's standard one-year warranty applies and service is provided through the company's worldwide network of authorized service centers.

Circle 707 on free information card

MONOslabs, concrete soil and turf reinforcing grids, are now offered by Grass Pavers Limited. The grids make areas capable of withstanding emergency vehicular traffic with axle-loads of not less than 11 tons (10 ton metric). MONOslabs foster the growth of grass and prevent soil from being compacted.

The concrete grids can be used to create auxillary, or even primary, parking areas in landscaped sections formerly not available for such usage.

Street and highway applications include emergency stopping and parking lanes, road shoulders, roadway slopes, temporary roads and highway cross-overs.

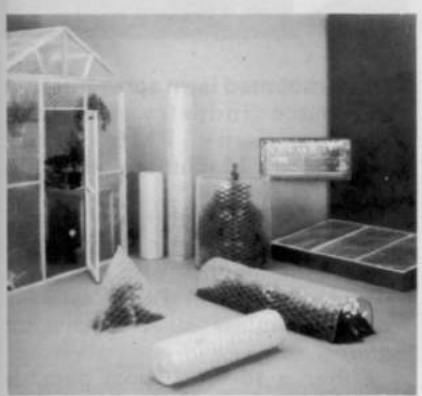
MONOslabs measure 23½-inches

by 15⅝-inches by 4 9/16-inches. They provide a gross surface area of 370 sq. inches per MONOslab. Each grid weighs approximately 90 pounds.

Circle 708 on free information card

A tractor-mower that allows close trimming with both sides is available from the Bunton Co. The mower features either a 71-inch or 61-inch front-center mower attachment which eliminates the side discharge of clippings. A 60-inch rotary broom and a 60-inch snow plow attachment are also available.

Circle 709 on free information card



Key-Lite, a steel reinforced film manufactured by Keystone Group, is adaptable to a wide variety of garden uses. The film can be used to build greenhouses, protect trees and shrubs, or to make cold-frames and garden row covers. Rust resistant Key-Lite is made of 20-gauge multi-directional wire, fully laminated between two layers of ultra-violet stabilized polyethylene film. It is available in 25-foot by 36-inch rolls and 100-foot by 72-inch rolls. Further, Key-Lite cuts easily with ordinary scissors and is reusable.

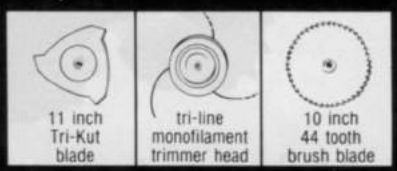
Circle 710 on free information card

HOFFCO ™
Whizz Witch

A tough 85cc engine stands behind trimming head and 2 cutting blades.

- **Tri-line, heavy duty monofilament trimmer head.**
- **11″ Tri-Kut weed blade cuts heavy weeds, briars and brambles.**
- **10″ 44 tooth brush blade (optional) cuts up to 3″ diameter saplings at ground level.**

HOFFCO-P10-A
BRUSHCUTTER/POWER SCYTHE
Offers the same equipment package, but the trimmer head is optional.



The 2 cycle, 22.5cc engine, can be operated in any position. Total wgt. 13½ lbs.

1. Monofilament trimmer head
2. 8″ Tri-Kut blade
3. (optional) 8″–44 tooth brush blade

HOFFCO
Brushette T.M.
Special merchandising displays available.

CHAIN SAW ATTACHMENT
Also attaches easily to most lightweight chain saws. • 8″ Tri-Kut weed blade • 8″ 44 tooth brush blade • optional monofilament trimmer • Use for overhead tree and brush trimming.

HOFFCO'S "HUMAN ENGINEERING"
The carrying harness and handlebars with anti-vibration grips can be adjusted for the comfort, balance and separates operator from cutting and trimming heads.

HOFFCO genie T.M.

Whizz Winch ™
1,000 lbs. of pulling power
Does the work of 10-20 people
14′ of working cable

HOFFCO PH 977-A
A true ONE MAN post hole drill Full wrap-around handles *deadman throttle control and kill switch on handle *Comet auto *centrifugal clutch *18.1 power ratio 2 to 8″ earth bits *8″ ice bit available. Drill to 30″ (4′ with extension accessory).

HOFFCO PH 1100-A 2-man
4-cycle engine. Special throttle control and auto. centrifugal clutch.

Write for free brochures & name of Distributors in your area . . .

DEPT. WTT-579 • 358 N.W. "F" STREET • RICHMOND, IN 47374

Circle **155** on free information card

IN THE FIRST PLACE, IT'S THE BEST CLEARING MACHINE YOU CAN BUY.

Anything else is a distant second. Why?

Because the Klearway is absolutely the fastest, most efficient clearing machine you'll ever turn loose in the woods. And it was designed from the ground up to do jobs you'd be smart to stay away from with the also-rans.

Every feature means better performance. It needs only one operator, who has an unobstructed and fully protected view from the sturdy cab. Klearway's powered by a Cat® diesel; on the business end are dual flywheel cutter discs that can breeze through 8-inch timber. And what about tough terrain? Klearway's fully articulating frame handles it with ease.

BEFORE

AFTER

See a Klearway in action for yourself, or write us for more information. There are different models for different jobs and optional equipment that'll even clear fence rows.

Klearway

Kershaw Manufacturing Company
2205 W. Fairview Avenue
Montgomery, Alabama 36108
205/263-5581

Circle **161** on free information card

Green's tractor-mounted, hydraulic pruning and harvesting platform offers a safe, secure working space to speed pruning. The platform, 16 inches by 48 inches, has safety railings on three sides. It is ruggedly built and reinforced for maximum safety. Heights of 16, 20 and 24 feet can be easily reached. The platform uses the tractor's hydraulic system and can be used on any tractor with a three-point hitch.

Circle 711 on free information card

A truck mounted lawn sprayer for the lawn care industry has been developed by FMC Corp., Agricultural Machinery Division, Jonesboro, Ark.

The sprayer features a tank, body, hose reel, gun, lights, and safety equipment. It also features a baffled 1200-gallon fiberglass tank with a stainless steel mechanical agitator.

Either a 10- or 20-gpm pump is available and power is supplied by the truck pto or a 12-horsepower Kohler engine with electric start. A Hershey water meter is built into the unit for recording output. Lights and safety equipment include body clearance lights, reflectors, flasher beacon light, and safety backup horn.

FMC has also developed a spray gun for the lawn care industry. Made of stainless steel, the gun features a ball seat which virtually eliminates plugging. Interchangeable discharge discs allow three- or five-gpm application rates.

For further information contact Jack Custer at (501) 935-1790.

Circle 712 on free information card

Jet Rinse, a new chemical container rinsing device, is available from Select Styled Systems. By attaching a garden hose, or hose from a nurse tank, and injecting the device into the bottom of the chemical can, the inside can be thoroughly rinsed. The process also leaves a hole in the bottom of the can, preventing its reuse.

According to Larry Siefken of Select Styled Systems, studies at Oregon State University have indicated that as much as six ounces of chemical can remain in an unrinsed 5-gallon container.

Rinsing permits total product usage. There is also a safety factor involved with chemicals left in cans. The jet Rinse tool is 10-inches long and can be used on metal or plastic cans.

Circle 713 on free information card

A new formulation of Daconil 2787, a broad-spectrum fungicide from Diamond Shamrock, is now available. The fungicide is now in a 500-gram per liter formulation. Daconil 2787 is approved for the control of a wide range of diseases including copper spot, Curvularia leaf spot, dollar spot, gray leaf spot, red thread, large brown patch, Helminthosporium leaf spot, and melting out. The new formulation provides a number of advantages including longer product stability and reduced viscosity.

Circle 714 on free information card

55 Years and over 5 million trees

Cottage Gardens inc.

SOUTH WAVERLY & BISHOP ROADS
LANSING, MI 48910
PHONE (517) 882-5728

Circle **173** on free information card

LEARNING THE CURVES

The MOTT INTERSTATER meets the challenge of side hills, steep terraces, and wet bottom lands. The operator can control the right, left, and the rear units independently, using any combination of units to get the job done.

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Reinco

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(201) 755-0921

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Atrinal, a systemic plant growth regulator, is available from Maag Agrochemicals Marketing, a unit of Hoffmann-La Roche, Inc. Atrinal is packaged as a liquid concentrate to be diluted according to directions for different species. When sprayed, it is absorbed through the leaves and transported systemically to the shoot tips of the plant, reducing or interrupting apical dominance, increasing the number of auxillary breaks, and enhancing side branching.

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A tree mover built to transplant eight-inch diameter trees that weigh up to 8,000 pounds has been introduced by Vermeer Manfacturing Co. The Vermeer TS-84T digs an 84-inch diameter tree ball up to 54-inches deep. The unit, which requires a truck with a rating of 34,000 pounds, features a six-spade design. The spades are activated hydraulically by large diameter threaded shafts powered by hydraulic motors. Spade masts do not have to be folded for transporting within legal road limits.

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A 100 percent sulfur-coated nursery fertilizer in a 20-6-12 and iron formulation is available from Lakeshore Equipment & Supply Co. The soluble nutrient sources in the fertilizer are coated with a sulfur membrane which controls the release of nutrients by preventing the access of water into the granule. Once water gains access inside the membrane outward movement of the nutrients commences.

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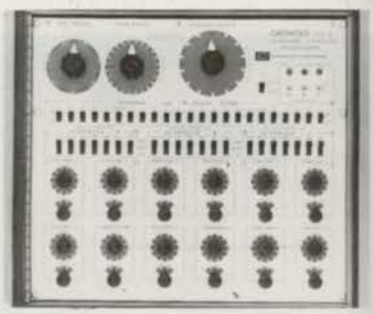

A series of irrigation controllers featuring a tensiometer moisture sensing circuit is offered by Griswold Controls. Designated the 2300X series, the control is a three-schedule programmer which allows the selection of three separate watering schedules to suit the differing watering requirements throughout a landscape.

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EVENTS

A Symposium on Turfgrass Diseases, Ohio State University, OARDC, & Chemlawn Corp., University Holiday Inn, Columbus, Ohio, **May 15-17.** Write: A Symposium of Turfgrass Diseases 1979, 2865 E. Orange Rd., Galena, OH 43021, or phone: Dr. P. O. Larsen, 614/422-6987, or Dr. B. G. Joyner, 614/885-9588.

Western Chapter, International Society of Arboriculture, Rochelle's, Long Beach, Calif., **May 17-18.** Contact: E. C. Bundy, phone: 217/328-2032.

Texas A&M University Turfgrass Research Field Day, TAMU Turfgrass Field Lab, Agronomy Road, TAMU Campus, College Station, Tex., **May 24.** Contact: Dr. Richard Duble or James Beard, Department of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843.

Quebec Chapter, International Society of Arboriculture, Laval University, Quebec City, Quebec, Canada, **May 25-28.** Contact: E. C. Bundy, phone: 217/328-2032.

Hofstra University Tenth Annual Plant Maintenance Seminar and Exhibit, Hempstead, NY, **June 5-7.** Write or call Trudy Buro, Hofstra University, Hempstead, NY 11550, 516/560-3315.

The Fertilizer Insititute Marketing Conference, The Greenbriar, White Sulphur Springs, W. Va., **June 10-13.** Contact: Doug Culkin, TFI, 1015 18th St., N.W., Washington, DC 20036, 202/466-2700.

Athletic Field Maintenance Short Course, The University of Minnesota, **June 14.** Location to be announced. Contact Richard Meronuck, Office of Special Programs, Agricultural Extension Service, University of Minnesota, St. Paul, MN 55108, 612/373-0725.

Texas Chapter, International Society of Arboriculture, La Mansion Motel, San Antonio, Tex., **June 15-17.** Contact: E. C. Bundy, phone: 217/328-2032.

Turfgrass Maintenance Equipment Field Day, University of Connecticut, Hartford Campus, **June 19.** Contact F. H. Nelson, 1280 Asylum Ave., Hartford, CT 06105, 203/236-6153. No registration fee, rain date June 20.

1979 Rutgers Research Field Day, Adelphia Research Center, Adelphia, N.J., **June 20.** Contact: Ralph Engel, phone: 201/932-9427.

ALCA/OSU Residential Design Short Course, Phoenix, AZ, **June 21-23** and Seattle, WA, **June 25-27.** Contact John Shaw, ALCA, 1750 Old Meadow Rd., McLean, VA 22102, 703/821-8611.

Illinois State Nurserymen's Assoc. Summer Conference, The Lodge of the Four Seasons, Lake Ozarks, MO, **June 24-27.** Contact ISNA, Suite 1701-Forum 30, Springfield, IL 62701.

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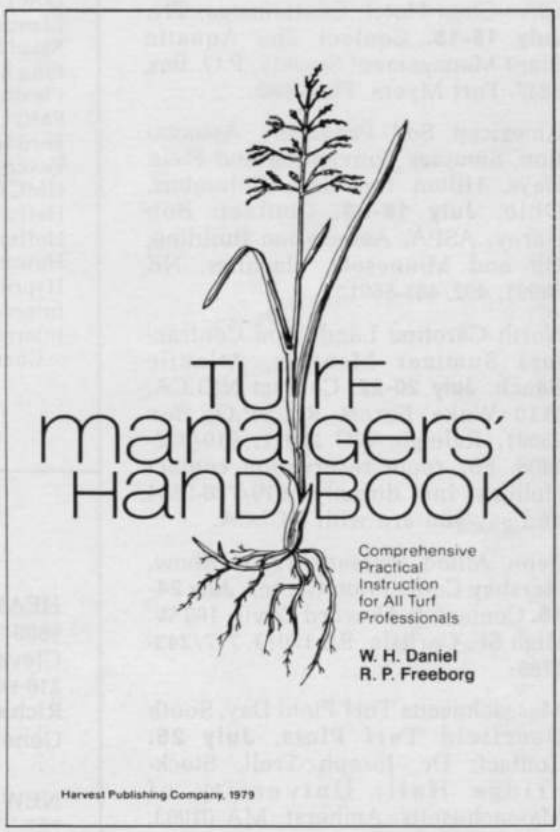

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EVENTS

American Seed Trade Association, Annual Conference, Hyatt Regency Hotel, Washington, D.C., **June 24-28.** Contact: Association, Executive Building, Suite 964, 1030 15th St., N.W., Washington, DC 20005.

New York State Nursery Convention and Trade Show, Niagara Falls, NY, **July 9-12.** Contact Margaret Herbst, New York State Nurserymen's Assoc., 101 Park Ave., New York, NY 10017, 212/685-4579.

Michigan Turfgrass Field Day, Crops Barn, Michigan State University, East Lasing, **July 10.** Contact: Dr. John E. Kaufmann, 322 Agriculture Hall, MSU, East Lansing, MI 48824.

Annual Meeting of the Aquatic Plant Management Society, Chattanooga Choo-Choo Hotel, Chattanooga, TN, **July 15-18.** Contact The Aquatic Plant Management Society, P.O. Box 2237, Fort Myers, FL 33902.

American Sod Producers Association, Summer Convention and Field Days. Hilton Inn East, Columbus, Ohio, **July 18-20.** Contact: Bob Garey, ASPA, Association Building, 9th and Minnesota, Hastings, NE 68901, 402/463-5691.

North Carolina Landscape Contractors Summer Meeting, Atlantic Beach, **July 20-22.** Contact NCLCA, 1110 Wake Forest Rd., P.O. Box 25891, Raleigh, NC 27611, 919/832-1498. For room reservation contact Holiday Inn directly, 919/726-2544 and say you are with NCLCA.

Penn Allied Nursery Trade Show, Hershey Convention Center, **July 24-26.** Contact: S. Howard Davis, 169 W. High St., Carlisle, PA 17013, 717/243-1786.

Massachusetts Turf Field Day, South Deerfield Turf Plots, **July 25.** Contact: Dr. Joseph Troll, Stockbridge Hall, University of Massachusetts, Amherst, MA 01003, 413/545-2353.

Illinois Landscape Contractors Assoc. Summer Field Day, Kankakee Nursery, Aroma Park, IL, **August 8.** Contact Carole Rachesky, 665 Forest, Glen Ellyn, IL 60137, 312/858-8574.

American Association of Nurserymen Management Seminar, Ohio State University, Columbus, OH, **August 19-24.** Contact AAN, 230 Southern Building, Washington, D.C. 20005, 202/737-4060.

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